The Class Will Start Shortly

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#1 FOR REHAB POWER

1

EDU0107-184 rev.D

CLINICAL CONSIDERATIONS FOR POWER WHEELCHAIR APPLICATION

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2

DISCLOSURE STATEMENT

- I work for Quantum Rehab who is a manufacturer of power wheelchairs, seating and positioning products and alternative drive controls. Some Examples in this presentation are products that we manufacture. All products are labeled by manufacturer for full disclosure and no products will be highlighted specifically due to manufacturer bias.

3

4

LEARNING OBJECTIVES

Participants will be able to:

- Describe differences between the manual and power mobility options based on their key features and code sets
- Distinguish the key differences between a group 2 and group 3 power wheelchair listing at least 2 primary distinguishing features
- Identify 3 medical conditions that may require intervention with mobility assistive equipment

4

5

OUR PROFESSIONAL NEEDS

- Despite global recognition of needs and acknowledgement of AT importance (specifically mobility related):
  - "the current global workforce does NOT have the capacity to adequately address the population's wheelchair provision needs" (Goldberg et al., 2022)
  - Too few people are trained or have access to training
- "Across OT, PT, and O&P programs as few as 2 hours of wheelchair service provision training were offered"
  - Generally, at least recommend there should be 40 hours (per the WHO) on basic level of provision
- Barriers: time constraints, professors with limited expertise in these areas, limited physical resources, difficulty integrating into circular, continuing education must be sought out

Goldberg, M., Rushton, P., Kirby, R. L., Muñera, S., Kandavel, K., Pearlman, J., & Tawashy, A. (2022). Wheelchair service provision content in professional rehabilitation organisations' standards documents and contemporary initiatives: a rapid review. *Disability and rehabilitation. Assistive technology*, 1–12. Advance online publication. https://doi.org/10.1080/17483107.2022.2063421

5

6

Determination of a Mobility Assistive Equipment (MAE) will be made by an **Algorithmic Process.**

What MAE device allows the individual to go from Point A to Point B in an:

- *Independent*
- *Safe*
- *AND timely* manner in order to accomplish MRADL's?

6

7

CLINICAL REASONING: AMBULATION

- Can your patient perform functional mobility walking?
  - Can they truly walk household distances (~150ft)?
- Are they consistently safe?
- Does your patient have decreased endurance?
  - Once at their destination can they perform a functional task?
  - How many rest breaks does it take to get to a destination?
  - How long does it take for patient to recover energy before performing a task?
- What is the energy cost?
  - Do they return to bed or sleeping throughout the day?
  - Do they miss out on or not complete tasks because they are too fatigued?

7

8

CLINICAL REASONING: MANUAL WHEELCHAIR

- Does the user have sufficient upper extremity or lower extremity strength to propel?
  - No previous shoulder injuries? Not at risk of shoulder impairment biomechanically?
- Has the endurance to propel a chair throughout daily routine and on various terrains consistently?
- Do they need a more adjustable MWC or just some power assistance?

https://www.medbridge.com/blog/wp-content/uploads/2018/08/gray-outline_posterior-pelvic-tilt_600x600.png

8

9

WHAT DOES SUFFICIENT UPPER EXTREMITY STRENGTH MEAN?

- 2 phases of wheelchair propulsion: propulsion & recovery
  - Typically see propulsive strength increase over time
- Shoulder stabilization muscles: rotator cuff, deltoid, long head of biceps
  - Tendency to see muscle imbalances and fatigue that lead to injurious positioning of the glenohumeral joint = impingement or overuse syndrome
- Need to set client up for biomechanical success in a manual wheelchair
- Provide a HEP that caters to resilience of shoulder joint
  - STOMPS protocol: stretching, warm up, strengthening, movement optimization
    - https://www.sralab.org/articles/blog/home-workout-stomps#:~:text=Strengthening%20and%20Optimal%20Movements%20for,a%20resistive%20shoulder%20exercise%20phase.
  - Need to strengthen: latissimus dorsi, pectoralis major, and teres major

Ambrosio F, Boninger ML, Souza AL, Fitzgerald SG, Koontz AM, Cooper RA. Biomechanics and strength of manual wheelchair users. J Spinal Cord Med. 2005;28(5):407-14. doi: 10.1080/10790268.2005.11753840. PMID: 16869087; PMCID: PMC1808266.

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10

A Wheelchair is covered if: Criteria 1, 2, 3, 4, 5, 6, are met; & Criterion 6 or 7 is met

The following criteria is 6 basic things needed to qualify for a manual wheelchair:

1. The patient has a mobility limitation that significantly impairs his/her ability to participate in one or more mobility-related activities of daily living (MRDAL) such as toileting, feeding, dressing, grooming, and bathing in customary locations in the home.

PLUS **A mobility limitation is one that:** Prevents the patient from accomplishing an MRADL entirely, or places the patient at reasonably determined heightened risk of morbidity or mortality secondary to the attempts to perform an MRADL; or Prevents the patient from completing an MRADL within a reasonable time frame.

2. The patient's mobility limitation cannot be sufficiently resolved by the use of an appropriately fitted cane or walker.

PLUS

3. The patient's home provides adequate access between rooms, maneuvering space, and surfaces for use of the manual wheelchair that is provided.

PLUS

4. Use of a manual wheelchair will significantly improve the patient's ability to participate in MRADLs and the patient will use it on a regular basis in the home.

PLUS

5. The patient has not expressed an unwillingness to use the manual wheelchair that is provided in the home.

PLUS

6. The patient has sufficient upper extremity function and other physical and mental capabilities needed to safely self-propel the manual wheelchair that is provided in the home during a typical day.

OR Limitations of strength, endurance, range of motion, or coordination, presence of pain, or deformity or absence of one or both upper extremities are relevant to the assessment of upper extremity function.

7. The patient has a caregiver who is available, willing, and able to provide assistance with the wheelchair.

If the manual wheelchair will be used inside the home and the coverage criteria are not met, it will be denied as not medically necessary. If the manual wheelchair will only be used outside the home, it will be denied as not medically necessary.

https://media.drivemedical.com/rs/planbdrivemed/images/K0004.pdf

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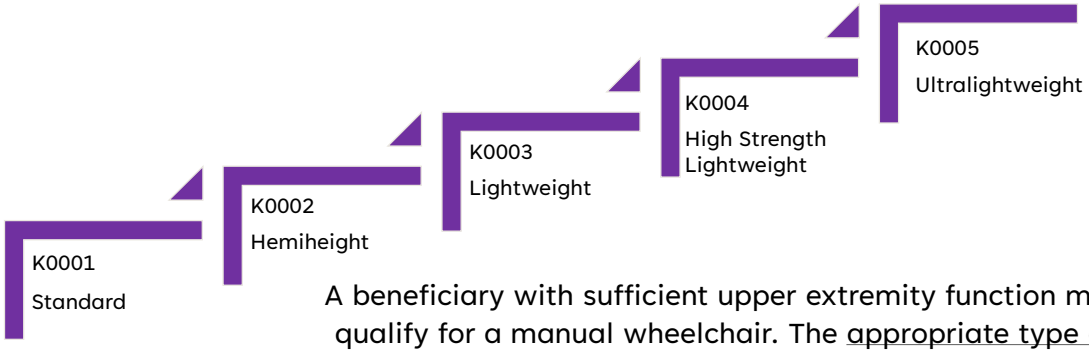
10

11

The Algorithmic Approach to Manual Wheelchairs



A beneficiary with sufficient upper extremity function may qualify for a manual wheelchair. The appropriate type of manual wheelchair, i.e. light weight, etc., should be determined based on the beneficiary's **physical characteristics** and **anticipated intensity of use**.

11

12

MANUAL WHEELCHAIR CONSIDERATIONS:

Standard (K0001)

Weight > 36 #

Seat Width 15" – 19"

Seat Depth 15" – 19"

Seat Height 19" or greater

Hemi-Height (K0002)

Seat Height < 19"

Lightweight (K0003)

Weight < 34 #

Actual available sizes:
16"W x 16"D, 16"W x 18"D, 18"W x 16"D & 18"W x 18"D

- Primarily mobile but not enough mobility to make it to doctors appointments or family outings?
  - Utilizing as a transportation chair typically

12

13

MANUAL WHEELCHAIR CONSIDERATIONS: HIGH STRENGTH LIGHT WEIGHT K0004

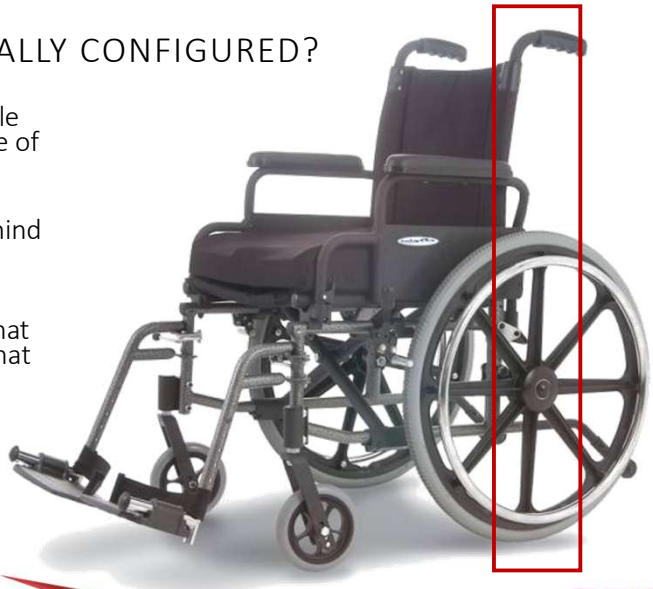
- Short Term Use
  - <34#
  - Consider a K0004 rental chair with an upgradeable backrest and seat cushion
  - Non-adjustable except rear wheel height
  - Heavier but patient showing promise of improvement to potential ambulation
  - Know that most rentals turn into a purchase after 12 months

*** Designed for the patient who requires a wheelchair for long term use (greater than 2 hours / day, greater than 3 months duration) who cannot self-propel in a standard weight wheelchair using arms and/or legs but can self-propel in a lightweight wheelchair that is customized to their needs.**

13

14

MWC OPTIMALLY CONFIGURED?



- In a "Standard" manual wheelchair the axle of the wheel is attached to the rear frame of the chair.
- This positions the axis of rotation well behind the shoulder joint of the individual user.
- Are there other configurations required that are available in a higher end wheelchair that are not available in a lesser chair?
  - Seat size configuration
  - Back height
  - Seat to Floor Height
  - Seat to Back Angle

62

14

15

ULTRA-LIGHTWEIGHT (K0005)-CUSTOMIZABLE

Weight < 30 #

- **Adjustable Rear Axle**
- Lifetime Warranty on the side frames and cross braces

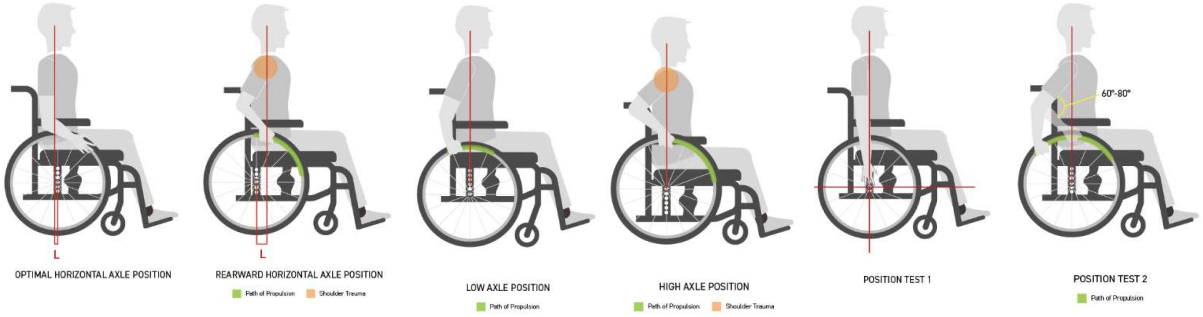
Coverage Criteria:

- Medical justification for the adjustable axle position
- Documentation must include a description of the patient's routine activities (frequency/nature) and whether they are fully independent in the use of the chair

15

16

K0005: BIOMECHANICAL SETUP

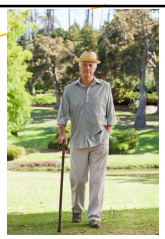


Images from motion composites
Green= path of propulsion
Orange= shoulder trauma

Hand at top of handrim with elbow extension 100-120 degrees (Medola et al., 2014)

Tefera, O. (2020, August 25). The Path to Perfect Propulsion. Retrieved July 20, 2023, from https://www.motioncomposites.com/en_us/community/blog/tips-and-tricks/the-path-to-perfect-propulsion?___from_store=en_ca.

16



Consider K0001-3 for those primarily mobile but need something occasionally for longer distances or outings

Consider a K0004 for someone using it for a "shorter" long term:

- >2 hours a day and for longer than 3 months
- Is a purchase at 13 months
- Not customized

K0005 Full time user, potential for shoulder overuse injury, using chair for longer term, highly active (don't forget about older end users)

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OPTIONS: POWER ASSIST

Great option for those with a K0005 wheelchair that then need some power benefit but skin management etc. is still good. Saves shoulders over time!
typically required to have MWC for at least one year

Emotion Wheels

NaviONE

Twion

Smart Drive

e-fix®

Alber Smoove

Quickie R90

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19

CLINICAL REASONING: MEDICAL MANAGEMENT

- History of a pressure injury?
- Impaired sensation?
- Sits in a wheelchair >2 hours/day
- Can your patient perform an effective weight shift (every 30 mins for 2 mins) consistently?
  - If the answer is no and the patient does not have a reliable 24/7 caregiver then you should be considering a system that allows repositioning for tissue profusion

Ariel V. Dowling, Valerie Eberly, Somboon Maneekobkunwong, Sara J. Mulroy, Philip S. Requejo & Joseph T. Gwin (2017) Telehealth monitor to measure physical activity and pressure relief maneuver performance in wheelchair users, Assistive Technology, 29:4, 202-209, DOI: 10.1080/10400435.2016.1220993

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20

MEDICAL MANAGEMENT: ACTIVITY TOLERANCE AND ENERGY CONSERVATION

- Bed bound risks: skin breakdown, pneumonia, decreased arousal and orientation, sub-optimal positioning for functional ADL tasks
- Can your patient conserve energy to be out of bed up to 8 hours or more a day or equivalent to baseline?
  - If they were able to reposition would that help?
  - If they could rest back and relax, could they return to a task in a reasonable amount of time?
- What positions when sitting would help your patient be independent?

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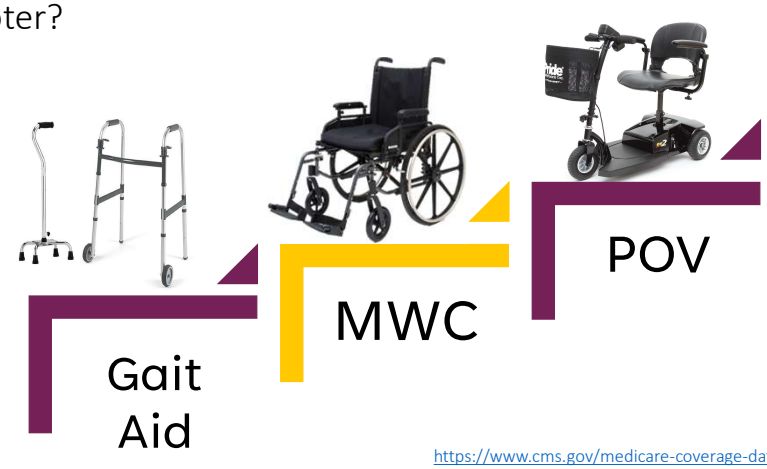
21

NATIONAL COVERAGE DETERMINATION FOR MAE

Does the beneficiary have sufficient strength and postural stability to operate a POV/scooter?



https://www.cms.gov/medicare-coverage-database/details/ncd-details.aspx?NCDId=219

21

22

RULING OUT OTHER POWER OPTIONS:

A POV is covered if the patient is able to:

- Safely transfer to and from a POV;
- Operate the tiller steering system; and
- Maintain postural stability and position while operating the POV in the home.

Does the beneficiary have sufficient strength and postural stability to operate a POV/scooter?

22

Group 1 vs. Group 2 Scooters

23

Group 1 POV (K0800 – K0802):

- 5-mile range
- 20 mm (3/4 in.) obstacle climb
- 3 mph speed
- Weight capacity:
  - ≤ 300 lbs.
  - 301 lbs. - 450 lbs.
  - 451 lbs. - 600 lbs.

Group 2 POV (K0806 – K0808):

- 10-mile range
- 50 mm (1.968 in.) obstacle climb
- 4 mph speed
- Weight capacity:
  - ≤ 300 lbs.
  - 301 lbs. - 450 lbs.
  - 451 lbs. - 600 lbs.

- Deemed to have "added capabilities that are not needed for use in the home" by some payers (i.e., Medicare)

23

National Coverage Determination for Mobility Assistive Equipment

24

Are the additional features provided by a power wheelchair needed to allow the beneficiary to participate in one or more MRADLs?

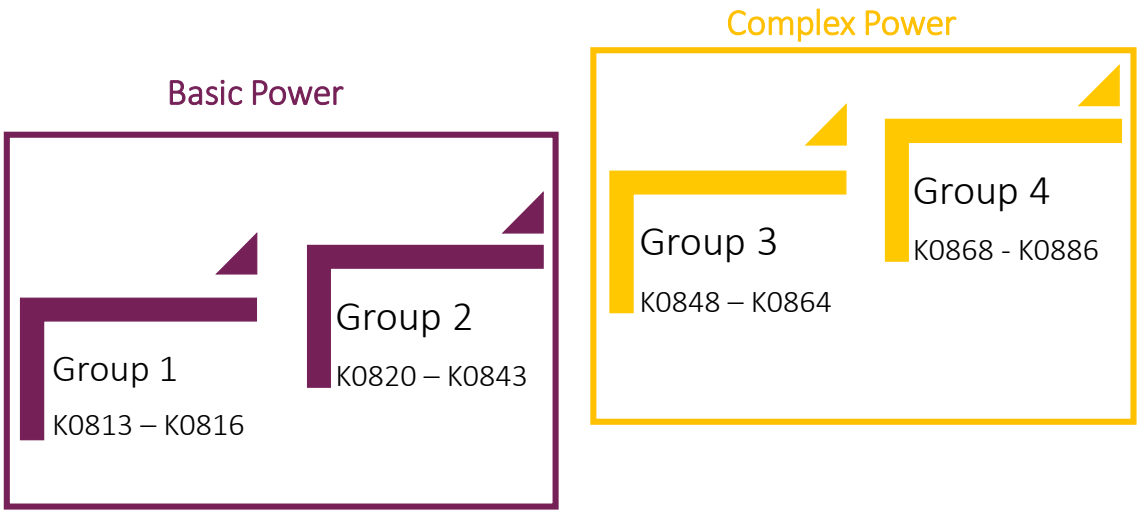
Basic PWC

Complex Rehab PWC

- The pertinent features of a power wheelchair compared to a POV are typically controlled by **a joystick or alternative input device**, lower seat height for slide transfers, and the ability to accommodate a variety of **seating needs**.
- The type of wheelchair and options provided should be appropriate for the degree of the beneficiary's functional impairments.
- The beneficiary's home should provide adequate access, maneuvering space and surfaces for the operation of a power wheelchair.
- Assess the beneficiary's **ability to safely use a power wheelchair**

24

The Algorithmic Approach to Power Wheelchairs



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25

STANDARD POWER CHAIR

Group 1 (K0813-K0816)

- 5 mile range
- 3 mph speed
- 6° incline (1:10)
- 20 mm (approx. ¾ in.) obstacle climb
- Weight capacity - 300 lbs. maximum

Comments:

- Intent was to create performance characteristics for limited, intermittent use <2 hours per day.
- Low battery life
- Basic seating with no skin protection and lacking stability
- Made for intermittent navigation of level surfaces
- No seating functions! Seat does NOT move

26

27

GROUP 2 POWER CHAIR

- More durable design and longer lasting but still limited battery life
- Speeds up to 3 mph
- Mid or front wheel option
- Mild management over uneven terrain; made for "regular" use on flat/hard surfaces
- Basic and minimal programming
  - Can not work with alternative drive controls
- Can allow only 1 and maybe 2 power seating functions
  - Some have a seat elevation option

28

PERFORMANCE CHARACTERISTICS

Group 2 (K0820-K0843)

- Sling/solid seat or captain's chair
- Single and multiple power options
- Weight capacities:
  - ≤ 300 lbs.
  - 301 - 450 lbs.
  - 451 - 600 lbs.
  - > 600 lbs.
    (except multiple power option)
- 7 mile range
- 3 mph speed
- 6° incline (1:10)
- 40 mm (1.575 in.) obstacle climb

Comments:

Intent to create performance characteristics as the minimum required for continuous use (> 2 hours per day).

29

COMPLEX REHABILITATION POWER WHEELCHAIR

A Group 3 PWC is covered if:

- The patient's mobility limitation is due to a neurological condition, myopathy, or congenital skeletal deformity
- The patient has had a specialty evaluation that was performed by a licensed/certified medical professional
- The wheelchair is provided by a supplier that employs a RESNA-certified Assistive Technology Professional (ATP) who specializes in wheelchairs and who has direct, in person involvement in the wheelchair selection for the patient
- Presence of drive wheel suspension
- Capability of customized programming and alternative drive control use

Patients with:

- High risk of skin breakdown and can not perform a functional weight shift
- Bladder needs including intermittent catheterization with inability to transfer independently to bed
- Increased tone or spasticity

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COMPLEX REHAB POWER WHEELCHAIR

Group 3 (K0848 – K0864)

- Sling/solid seat or captain's chair
- Single and multiple power options
- Weight capacities:
  - ≤ 300 lbs.
  - 301 - 450 lbs.
  - 451 - 600 lbs.
  - > 600 lbs.

  (except multiple power option)
- 12 mile range
- 4.5 mph speed
- 7.5° incline (1:7.6)
- 60 mm (2.362 in.) obstacle climb

- Non-expandable controller – **capable** of upgrade to expandable controller
- Standard proportional joystick – **capable** of upgrade to alternative input device
- **Drive wheel suspension**

Comments:

Intent to create characteristics for active users with continuous use needs

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31

GROUP 2 VS. GROUP 3 CHARACTERISTICS

- Group 2
  - Minimum top speed: 3 mph
  - Minimal range: 7 miles
  - Obstacle climb: 1.5”
- Group 3
  - Minimum top speed: 4.5 mph
  - Minimum range: 12 miles
  - Obstacle climb: 2.36”
  - **Drive wheel suspension**

Average brisk walk speed= 4.5 mph essential when needed i.e. crossing streets
Consider distance per charge especially for a full-time user in chair up to 12-18 hours/day
When going over uneven terrain this pulls from battery life more
Constant jarring forces can contribute to pain of PWC users over time

Suspension:

- Absorption of jolting/vibratory forces on wheelchair and wheelchair user
- Ability to maneuver over a variety of terrains, optimizing environmental transitions
- Increased stability of the power base in all environments of use
- Reduced stress/fatigue on components = fewer repairs

31

32

DOES YOUR CLIENT NEED SMOOTH RIDE SUSPENSION?

1. Does your client have a PWC and use it on unlevel terrain (i.e., thresholds, sidewalks, etc.)?
2. Does your client experience pain or fatigue while using their PWC?
3. Does your client have balance challenges, postural asymmetry or use postural support components when sitting in their PWC?
4. Does your client have spasticity, abnormal muscle tone, muscle imbalance, reflex activity or clonus that is exacerbated when using their PWC?
5. Does your client lose contract with the joystick while driving their PWC?
6. Does your client use an alternative drive control device on their PWC?

32

Power chair as a means to recovery (or early mobility exploration)

33



or to accommodate for changes in body function/structures and/or activities/participation




and provide safety, timely and independent mobility across the lifespan.

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34

CONSIDERATIONS FOR A POWER WHEELCHAIR

- Does the user understand cause and effect and can demonstrate a consistent/reliable activation site?
- Do they have adequate visual perception to safely maneuver a PWC?
- What is there home environment and can it get into/out of the home along with maneuver to key areas?
- Are there transportation options?

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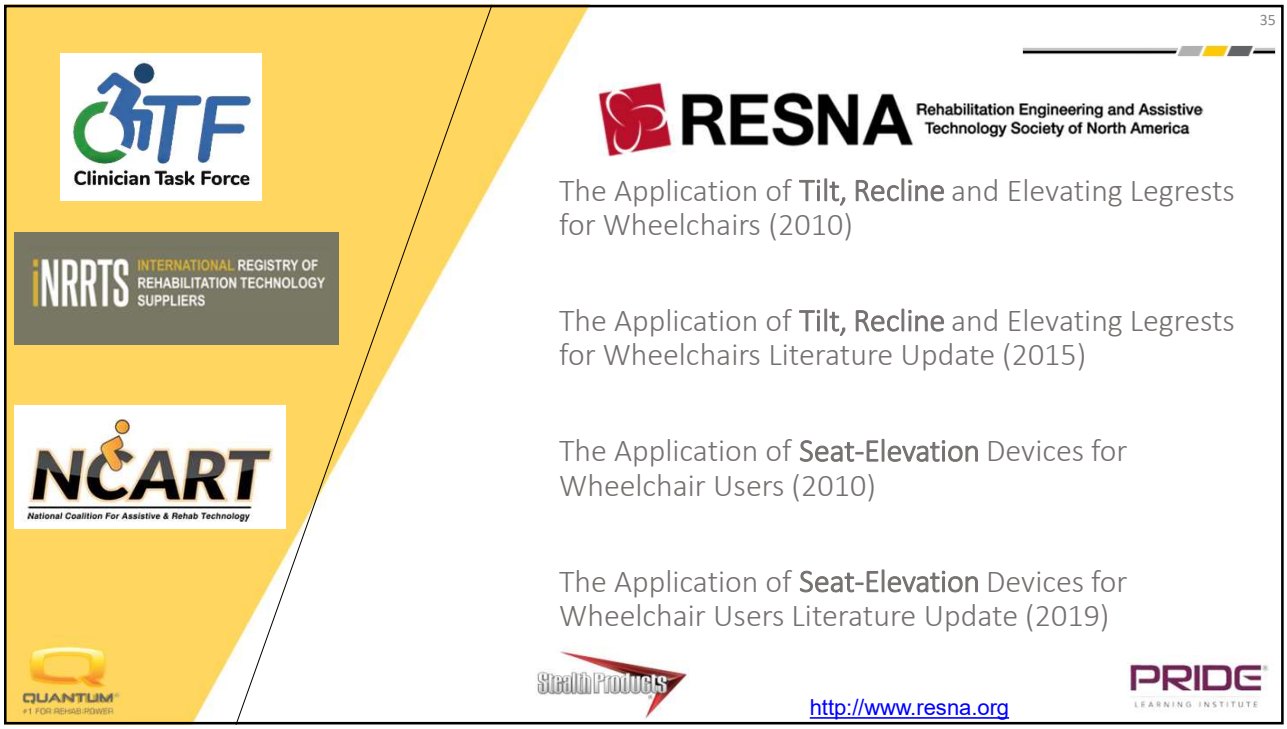
35
Clinician Task Force
iNRRTS INTERNATIONAL REGISTRY OF REHABILITATION TECHNOLOGY SUPPLIERS
NCART
National Coalition For Assistive & Rehab Technology
RESNA Rehabilitation Engineering and Assistive Technology Society of North America
The Application of Tilt, Recline and Elevating Legrests for Wheelchairs (2010)
The Application of Tilt, Recline and Elevating Legrests for Wheelchairs Literature Update (2015)
The Application of Seat-Elevation Devices for Wheelchair Users (2010)
The Application of Seat-Elevation Devices for Wheelchair Users Literature Update (2019)
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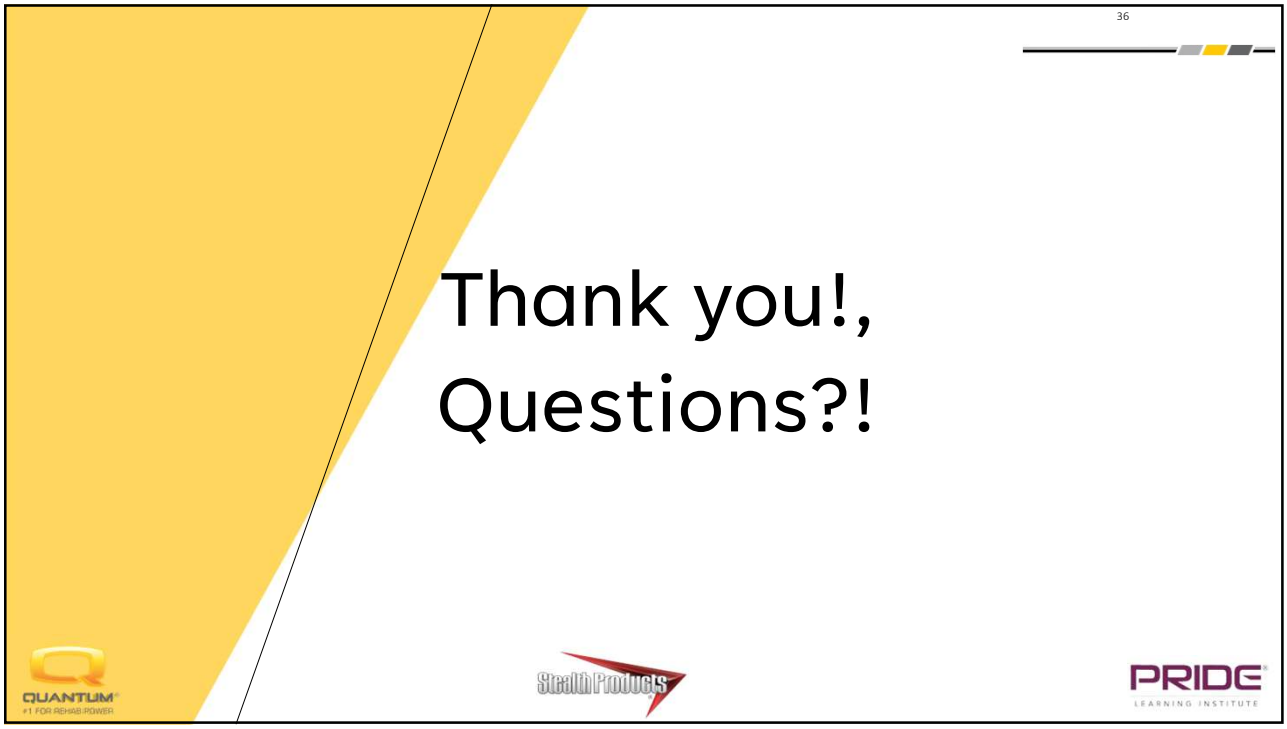
36
Thank you!,
Questions?!
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36