Development of a Functional Assessment Measure for Manual Wheelchair Users

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Supported by Department of Veterans Affairs, VA Rehabilitation Research and Development Service Merit Review Project #B2168RA (Principal Investigator: Dr. Mary M. Rodgers)


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ABSTRACT
The aim of this investigation was to develop the Wheelchair Users Functional Assessment (WUFA©). Because no functional outcome tools exist that are specific to daily activities of individuals using manual wheelchairs, development of the WUFA© is important. Although the Functional Independence Measure (FIM™) can be used to assess disability in those using a wheelchair, it only measures some aspects of basic activities of daily living (ADL), and does not measure community independence. Therefore, both basic activities as well as community activities have been included in the WUFA©. A panel of six rehabilitation experts, with input from manual wheelchair users, determined content of the WUFA©. The resulting WUFA© scale includes 15 items. Inter-rater and intra-rater reliability were established by using a two-way analysis of variance (ANOVA) and intraclass correlation coefficient (ICC). No significant differences were found between raters or between tests (p=0.15 and p=0.14 respectively). ICC for inter-rater reliability was 0.96 and for intra-rater reliability ICC=0.78. Further analysis was performed on the internal consistency of the 13-item tool using a sample of 101 tested subjects. This was done using a Cronbach’s Alpha. Results indicate excellent internal consistency of the 13 items. The standardized coefficient alpha was 0.96. The WUFA© is shown to have content validity, good inter-rater and intra-rater reliability, as well as internal consistency. Further research is warranted to determine the WUFA©’s sensitivity and ability to discriminate between levels of functional independence.

Key Words: assessment, function, independence, wheelchair users
Running Head: Functional Measure for Wheelchair Users
For individuals who use manual wheelchairs as their primary mode of ambulation, rehabilitation requires skill acquisition if the wheelchair user is to function independently at home and in the community. Measurement of home and community functional ability is essential in evaluating the outcomes of rehabilitation. Although there are no tools that have been designed to specifically assess functional ability of the diverse group of individuals using a wheelchair, there are tools that have been developed to assess those having spinal cord injury (SCI). These include the Quadriplegia Index of Function (QIF), the short-form QIF, the Capabilities of Upper Extremity (CUE), and the Spinal Cord Independence Measure (SCIM) (1-3). Although these tools are specific to assessing problems in performance of functional activities encountered by those having SCI, they are not comprehensive and do not include wheelchair skills that are required for community independence. In addition, scores are negatively affected if a wheelchair is used.

Two other tools that are often used with those using a wheelchair are the modified Barthel Index (MBI) and the Functional Independence Measure (FIM™) (4,5). These tools were developed to assess the degree of independence in diverse patient populations. As with the above mentioned tools, the MBI and FIM™ only assess basic ADL and mobility and a lower score is given if the individual uses a wheelchair. The disadvantages to all of these tools is that they were not designed to test specific skills necessary for functional independence for manual wheelchair users and they do not measure skills needed to be independent in the community.

Of the above mentioned tools the FIM™ has been widely adopted by the rehabilitation industry as a tool to be used with diverse patient populations. Even so, as pointed out by Middleton and associates, skill needed for independence in the community are not adequately reflected by the FIM™ wheelchair locomotion item (ref). They recommend expansion of the existing FIM™ wheelchair item to include more advanced wheelchair mobility skills. Because of the lack of a comprehensive tool specific to manual wheelchair users (MWCU), the aim of this research was to develop a functional measure that is easy to administer and score, with application to the wide range of individuals who use manual wheelchairs. It was important that the tool: 1) incorporate home and community wheelchair skills; 2) be able to detect change in functional status; and 3) be able to differentiate between wheelchair users with varying levels of independence. We also chose to develop this tool, adapting selected items of the FIM™, to provide a frame of reference encompassing the existent measurement strategy. In this article, we report on the initial development of the Wheelchair Users Functional Assessment (WUFA©), as well its content validity, reliability and internal consistency of the items.

Methods

Content Validity

Content validity is the “degree to which the items in an instrument adequately reflect the content domain being measured” (6). Because content validity is subjective, a panel of experts is often used in its determination. This subjective process is carried out until all of the experts reach a consensus regarding the content of the instrument.

For the initial development of the WUFA©, a panel of six physical therapists was used. All participants were experts in the rehabilitation of MWCU and in the ability to identify the levels of independence for individuals who use wheelchairs. The panel included three physical therapy faculty members and three clinicians. Of the three faculty members, one has 10 years of research experience with wheelchair users including SCI; one has clinical and research
experience in geriatrics and functional assessment; and the third is certified by the American Physical Therapy Association as a Neurologic Certified Specialist. The three clinicians were certified FIM™ examiners with experience in rehabilitation of manual wheelchair users. Initially, the panel members each developed a list of items that were thought to be important for independent living in the home and community. From these six lists, the panel collectively agreed on 18 items that were important. In addition to the expert panel, thirty MWCU completed surveys regarding opinions of skills necessary for wheelchair users to be independent in the home and community. The MWCU were given the list of the 18 activities and asked to indicate “yes” or “no” if they were able to perform the tasks independently. They were then asked which items were important tasks to learn in order to be independent. The individuals were also given an opportunity to add any further items that were not included in the survey. The panel reviewed these surveys and selected items that were identified as important to include in the WUFA©. Based on the comments of the MWCU, four of the original 18 items were eliminated and two items were modified. The resulting WUFA© scale included 15 items (Table 1). Items that were eliminated included performing wheelies, managing bowel and bladder, driving, and using escalators. Wheelies were eliminated because it was felt that this skill is necessary to complete the curb and ramp tasks that were included on the final version. Managing bowel and bladder was dropped because the physical portion of the task is included in a toileting task. Driving and using escalators were dropped because it was decided people could be independent without the use of these skills. The tasks that were modified were cooking and cleaning the house. Instead of formally having someone cook, a carrying and lifting task was modified to include reaching. To simulate cleaning, a sweeping task was used. Although some of the items on the WUFA© are similar to items on the FIM™, no item on the WUFA© is identical to any item on the FIM™.

In developing the scoring system for the WUFA©, level of independence was our measure of interest. Independence can be assessed in several ways. It may be based upon dependence or the amount of assistance that is required to perform the task, the amount of time it takes to do the task, or perhaps whether the individual uses assistive devices while performing the task (7). The WUFA© incorporates all of these assessments when evaluating level of independence. Items are scored in a manner similar to the FIM™ ranging from one (total dependence) to seven (completely independent). On the WUFA©, a score of six or seven includes a specific time requirement for task completion, which differs from the FIM™. This time requirement for each item was determined by videotaping one highly trained and functioning MWCU. This individual was considered to be very independent by the expert panel. Each item was timed while the individual performed the task. The resulting time was then determined to be the cutoff for receiving a score of seven or six. To receive a score of seven the person must score under the cutoff time and if over the person would receive a six. In addition, the amount of assistance required and whether assistive devices are used are taken into consideration when determining the score for each item. The highest total score that can be received is 91.

Following the development of items and the scoring system, the panel then evaluated an individual performing the tasks on videotape. Modifications were made to the WUFA© at this time. These modifications included the following. First, it was decided not to have the individual obtain clothes from the closet before dressing and instead have the clothes out and on the plinth or bed where the dressing task is performed. Second, some of the directions were worded in order to provide more clarity. Third, what qualified as an assistive device for the
bathroom toilet transfer and bathing tasks was redefined. Last, the maximum time requirement to complete the task for a score of independent for the dressing task was re-established.

**Reliability**

To evaluate inter-rater and intra-rater reliability, six raters assessed five subjects on videotape performing the WUFA© tasks. One month later, the six raters reassessed the five videotaped subjects. Subject descriptions are provided in Table 2.

**Internal Consistency**

Following finalization of the content of the WUFA and determination of reliability, the tool was administered one time to 101 subjects. This data was used to determine internal consistency of the 13-item test.

**Data Analysis**

Inter-rater and intra-rater reliability were established by using a Two-way Analysis of Variance (ANOVA) and intraclass correlation coefficient ($\alpha \leq 0.05$). A Cronbach’s Alpha was used to determined the internal consistency of the 13-item test.

**Results**

The Cronbach’s Alpha resulted in good internal consistency between the 13 items on the WUFA. The standardized coefficient alpha was 0.96.

**Discussion**

The WUFA© includes 13 items that are scored on a Likert type scale depending on time to complete the task, the amount of assistance required, and whether assistive devices are used. A panel of physical therapists and a convenience sample of MWCU determined content validity for the items on the WUFA©. The final items included were judged necessary for home and community independence. Both inter- and intra-rater reliability were found to be good for the WUFA©.

Although extensive research in functional outcome measures has been performed, there are no tools specific to MWCU. The tool most frequently used to evaluate wheelchair users is the FIM™. The FIM™ was developed as a disability indicator of “burden of care” (5). It is a measure of disability regardless of nature or extent of pathology or impairment. The developers intended that the FIM™ be a general assessment tool that is applicable for patients with a variety of disabilities. This is beneficial for comparing outcomes of rehabilitation intervention across different facilities that serve a wide variety of patients. The level of assistance that is required by the person is used to determine functional status. This is graded from total independence to total assistance (7). Because there is no gold standard specific to MWCU, the FIM™ was used as the criterion standard in the development of the WUFA©. One of the strengths for using the FIM™ as the criterion is that it has undergone numerous psychometric evaluations. The FIM™ has demonstrated excellent interrater reliability (8,9) as well as high internal consistency (10). Granger and associates using the Delphi method determined face and content validity (11); and construct validity has been determined by Dodds et al (10).

Although the FIM™ has been adopted by numerous professional organizations in the rehabilitation industry as a measure of disability, including endorsement by the Model System Spinal Cord Injury Center (9), it limits the score that a MWCU can attain. For example, a wheelchair dependent individual cannot score a “7” in most areas of the FIM™ because they use
a wheelchair or other assistive device for independence. It is possible though for a wheelchair user to score a “6” or “modified independence” on all areas of the motor FIM™ and still be completely independent with all self-care and home activities, as well as grocery shopping, driving, community propulsion, and carrying loads. Also, many of the tasks essential for independence as a MWCU are not reflected on the FIM™. Consequently, the WUFA® was developed because of the need for an outcome tool that accurately measures functional independence in MWCU, reflecting both home and community skills.

Like the FIM™, the WUFA® is a performance-based tool versus a capacity-based tool. This means the individual actually performs the task versus just saying they could do it even if they usually do not. An advantage to this type of approach is that the observer can get a better idea as to what the individual can actually do. It does not rely on self-report of the individual. This may be the better approach when trying to determine goal oriented intervention strategies and discharge status. As pointed out by Guralnik and associates, there are several other advantages to performance-based instruments (12). These include face validity for the task being performed, better reproducibility, and greater sensitivity to change. Disadvantages include more time to administer the test, need for adequate space and special equipment, and training needed for examiners. Another disadvantage is that a standardized, performance-based tool such as the WUFA®, does not take into account that the individual may not under normal circumstances perform that task or perform it in the standardized fashion. For example, an individual may live in housing that does not require him/her to climb stairs. Consequently, they have never learned how to go up and down stairs and maneuver the wheelchair at the same time. The WUFA® does not take this into consideration. The individual either performs the task or does not and is scored accordingly. Although the individual may live independently in his/her environment, the WUFA® may score them as being dependent in this particular task.

Unlike the FIM™, the WUFA® is a condition-specific assessment instrument (also known as disease-specific) in that it was specifically designed to be used with individuals who use a manual wheelchair for at least 80% of their home and community mobility. The reason for being in the wheelchair was not taken into consideration during the development of the tool. Therefore, the WUFA® has been developed with respect to its heterogeneity and can be used with a variety of injury and disease processes resulting in the individual having to use a wheelchair i.e., spinal cord injury, stroke, multiple sclerosis. Advantages to condition-specific instruments include content validity and sensitivity to change (13,14). In addition, because the items were developed for wheelchair users, the use of a tool such as the WUFA® may allow the rehabilitation specialist to differentiate specific areas of limitation that may be improved. Thus, guiding intervention strategies and discharge planning.

As the pressure to demonstrate efficacy of rehabilitation increases, the demand for appropriate outcome measures grows. A good understanding of the validity and reliability of such tools is necessary. The results of this study indicate that the inter-rater and intra-rater reliability of the WUFA® are high. Although initial content validity has been established, further study is warranted for tool validation such as comparing the WUFA® to other measures of functional independence, determining the WUFA®’s ability to detect change in function and its ability to discriminate between levels of functional independence.
References


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<td>Reaching function</td>
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<td>Picking up objects/sweeping</td>
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## Table 2 - SUBJECT PROFILE

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<td>M</td>
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## Table 3 - Raw Scores for Test 1 and Test 2 by Rater and Subject

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WHEELCHAIR USERS FUNCTIONAL ASSESSMENT (WUFA)

This functional outcome tool is adapted from the motor component of the Functional Independence Measure (FIM) to provide information about level of independence in the home and community specific to the manual wheelchair dependent individual. This tool is appropriate for those individuals who rely predominately on a wheelchair for all home and community mobility. Similar to the FIM, it is a basic indicator of severity of disability. Some modifications have been made which include the timing of activities that do not require physical assistance (i.e., scores 6 and 7). It is difficult to control the effect that the amount of assistance and how quickly it is given has on the timing of the task, so only the “complete independence” and the “modified independence” classifications are timed. The definition of assistive device has changed in that a wheelchair is no longer considered an assistive device as the wheelchair dependent individual will always have it with him/her at home and in the community and does not rely on the community to provide this device. The upper and lower body dressing have been combined for overall timing and ability to dress. The manual wheelchair user will not have as severe upper extremity restrictions that require the separate upper and lower body dressing category. The bathing task combines the transfer to the tub along with the bathing task, rather than separate tasks, as they are not performed independent of each other. The last two tasks are the “Functional Mobility in the wheelchair” activity which combines a variety of movements required for functional independence in a wheelchair. These tasks include: lifting (light and heavy objects), bending to floor, sweeping, pouring, reaching overhead, general trunk balance in wheelchair, and carrying objects.

This tool is a seven-level scale that determines functional performance from total dependence to independence. The criteria for each functional task and performance requirements for each score are described specifically. The performances of an individual will be expected to change, so this tool will generate data to analyze the outcomes of rehabilitation.

Similar to the FIM, the scale is not limited to only the independent individuals in that it classifies patients by ability to perform activity independently, or whether another person is needed, or how much assistance is needed. The need for assistance (burden of care) is related to the time/energy that another person must expend to serve the dependent needs of the disabled individual to achieve and maintain a certain quality of life.

Also similar to the FIM, this tool is a measure of disability, not impairment. The FIMWC is intended to measure what the patient with the disability actually does, not what he/she might be able to do if the circumstances were different. For instance, a patient with cognitive deficits might have the physical capability to perform better, but due to their cognition, may demonstrate decreased performance or decreased safety.

To be categorized at any level, the patient must complete the entire task. Each task description gives verbal directions to instruct patients and then set up with objective measures to score patient. Each task is broken down into parts, and the patient must complete the entire part to receive credit for performance of that part.
WHEELCHAIR PROPULSION--MANEUVERING IN TIGHT SPACE

Directions: Propel wheelchair down straight line, turn 180 degrees in designated space, and propel back. Stay within the designated lines. Perform as fast as you can.

Performance requirements: Need designated area with a marked start line followed by 5 feet straight line and a 60 inch diameter circle. Patient will 1) propel 5 feet, 2) turn 180 degrees in 60 inch diameter space 3) propel back 5 feet. If the patient crosses boundaries, he/she is not given credit for that part of task. Timing will begin at start of 5 foot runway and end at the same point.

7 Complete independence: Patient performs all three parts of activity safely without assistance in less than 25 seconds.

6 Modified independence: Patient performs all three parts of activity safely without assistance in greater than 25 seconds.

5 Supervision or Set up: Patient requires cues or coaxing or stand by for safety to perform any three parts of the task.

4 Minimal Assistance: Patient requires assistance with 1 of the 3 parts of the task.

3 Moderate Assistance: Patient requires assistance with 2 of the 3 parts of the task.

2 Maximum Assistance: Patient requires assistance with all 3 parts of the task.

1 Total Dependence: Patient is unable to perform any part of activity or requires assistance of two people.
WHEELCHAIR PROPULSION--UNEVEN TERRAIN

**Directions:** Propel wheelchair onto carpet, go to the marked point at end of carpet, turn around on the carpet, and propel back until off of carpet. Perform as fast as you can.

**Performance requirements:** Carpet is 25 feet long on floor 12 inches before start of carpet is start/finish line. Patient 1) maneuvers wheelchair onto carpet, 2) propels 25 feet on carpet, 3) turns around on carpet, 4) propels back 25 feet, 5) gets off carpet. Timing will begin at start line on floor and at same line.

7 Complete independence: Patient is able to perform all 5 parts of task safely without assistance in less than one minute.

6 Modified Independence: Patient is able to perform all 5 parts of task safely without assistance, but requires more than one minute to perform.

5 Supervision or Setup: Patient requires cues or coaxing or stand by for safety to perform any 5 parts of task.

4 Minimal Assistance: Patient requires assistance for 1 of the 5 parts of the task.

3 Moderate Assistance: Patient requires assistance for 2 of the 5 parts of the task.

2 Maximum Assistance: Patient requires assistance for 3 or more of the 5 parts of the task.

1 Total Dependence: Patient unable to perform activity or requires assist of more than one person.
WHEELCHAIR PROPULSION--DOOR MANAGEMENT

**Directions:** Open the door, go through the doorway, and close the door. Perform as fast as you can.

**Performance requirements:** Use standard manual opening door. Patient able to 1) open door, 2) maneuver through doorway, 3) close door. Patient will be positioned 12 inches from door. Timing will begin at “go” and stopped when door completely shut.

7 Complete Independence: Patient able to perform all 3 parts of task safely without assistance in 15 seconds.

6 Modified Independence: Patient able to perform all 3 parts of task safely but requires use of modified door handle or takes longer than 15 seconds to perform.

5 Supervision or set up: Patient requires cues or coaxing or stand by for safety to perform any 3 parts of task.

4 Minimal Assistance: Patient requires assistance with 1 of the 3 parts of the task.

3 Moderate Assistance: Patient requires assistance with 2 of the 3 parts of the task.

2 Maximum Assistance: Patient requires assistance with all 3 parts of the task.

1 Total Dependence: Patient unable to participate in activity or requires assist of more than one person.
WHEELCHAIR PROPULSION--STREET CROSSING

Directions: This task simulates crossing the street. Propel wheelchair down curb cut, propel the designated distance, and up the curb cut, continue until you are on level surface. Perform as fast as you can.

Performance requirements: Designate area for task including curb cut, 75 feet of straight propulsion, and curb cut. Patient will 1) Propel down curb cut, 2) propel 75 feet straight distance 3) propel up curb cut. Timing will begin when front wheels hit down grade of curb cut and end when back wheels clear upgrade of curb cut (return to level surface).

7 Complete Independence: Patient will perform all three parts of activity safely in 25 seconds.

6 Modified Independence: Patient will perform all three parts of activity safely, but takes longer than 25 seconds.

5 Supervision or Set up: Patient able to perform any 3 parts of activity, but requires cueing or coaxing to perform.

4 Minimal Assistance: Patient requires assistance for 1 of 3 parts of activity.

3 Moderate Assistance: Patient requires assistance for 2 of 3 parts of activity.

2 Maximum Assistance: Patient requires assistance for all 3 parts of activity.

1 Total Dependence: Patient unable to perform activity or requires assistance of more than one person.
WHEELCHAIR PROPULSION--RAMP

**Directions:** Go up to top and down the ramp any way that you want. If you feel the ramp is too steep, let me know.

**Performance requirements:** Have a 6 foot ramp 8:1 (8 inch long to one inch high grade) and ramp 12:1 available. Patient will 1) go up the ramp, 2) maintain balance, 3) go down the ramp.

7 Complete Independence: Patient performs all parts of task on 8:1 ramp safely in one minute.

6 Modified Independence: Patient performs all parts of task on 8:1 ramp safely, but in greater than one minute or able to perform all parts of task on 12:1 ramp safely in one minute.

5 Supervision or Set up: Patient requires coaxing or cueing for completion of task, or stand by for safety.

The following will be assessed on 12:1 ramp:

4 Minimal Assistance Patient requires assistance with 1 of the 3 parts of the task.

3 Moderate Assistance: Patient requires assistance with 2 of the 3 parts of the task.

2 Maximum Assistance: Patient requires assistance with all 3 parts of the task.

1 Total Dependence: Patient is unable to perform task or requires the assist of more than one person.
WHEELCHAIR PROPULSION--CURB

**Directions:** Start at any position that you feel comfortable. Go up and down curb as fast as you can. Let me know if you need a lower height.

**Performance requirements:** Need 6 inch curb and 4 inch curb available. Patient will 1) Get two wheels up 2) four wheels up, 3) two wheels down, 4) four wheels down. Begin timing when at start of approach, stop when all 4 wheels touch the ground.

7 Complete independence: Patient will perform all four parts of task on 6” curb safely without assistance in 30 seconds.

6 Modified independence: Patient will perform all four parts of task on 6” curb in greater than 30 seconds or perform all four parts of task on 4” curb in 30 seconds.

5 Supervision or Set up: Patient requires cueing or coaxing to perform any four parts of task or stand by for safety.

The following will be scored on 4” curb:

4 Minimal Assistance Patient requires assistance for 1 of 4 parts of task.

3 Moderate Assistance: Patient requires assistance for 2 of 4 parts of task.

2 Maximum Assistance: Patient requires assistance for 3 or more parts of task.

1 Total Dependence: Patient is unable to perform task or requires assistance from more than one person.
WHEELCHAIR TRANSFER--BED

Directions: From your wheelchair transfer to bed, lay down on your back, sit up, transfer back to wheelchair. Perform activity as fast as you can.

Performance requirements: Need a 20 inch high bed. Mark point on floor 12 inches from bed for start and end point. Patient will 1) transfer from wheelchair to bed (includes management of wheelchair positioning and parts management), 2) move from sitting to supine (includes leg management), 3) supine to sitting (including leg management), 4) transfer back to wheelchair (includes wheelchair management of positioning and parts management.) Timing will begin with wheelchair 12 inches from bed (start of positioning wheelchair for transfer) and stopped when in wheelchair 12 inches from bed.

7 Complete independence: Patient will perform all 4 parts of task safely without assistance or assistive devices within two minutes.

6 Modified independence: Patient will perform all 4 parts of task safely without assistance requiring greater than two minutes or requiring the use of assistive devices (i.e. slide board, bed rails, leg lifters or straps).

5 Supervision or Set up: Patient requires cues or coaxing or stand by for safety to perform any 4 parts of task or set up of equipment such as positioning slide board, placement of straps, etc.

4 Minimal Assistance Patient requires assistance for 1 of 4 parts of the task.

3 Moderate Assistance: Patient requires assistance for 2 of 4 parts of the task.

2 Maximum Assistance: Patient requires assistance for 3 or more parts of the task.

1 Total Dependence: Patient is unable to perform activity or requires the assist of more than one person in any part of the task.
**WHEELCHAIR TRANSFER--TOILET**

**Directions:** From your wheelchair transfer onto toilet, pull pants down, demonstrate perineal hygiene, pull pants back on, transfer off toilet back to your wheelchair. Do not hold onto sink or bars unless you need them for balance. Use only toilet and wheelchair to assist you. Perform activity as fast as you can.

**Performance requirements:** Need toilet, oversized pants, toilet paper. Patient will 1) transfer onto toilet from wheelchair using any transfer he/she feels comfortable with, 2) pull pants down, 3) demonstrate perineal hygiene, 4) pull pants back on over hips, 5) transfer off toilet. Patient will begin with oversized pants on, timing will begin at start of transfer and stop at end of transfer back to wheelchair.

7 Complete independence: Patient is able to perform all five parts of activity safely without assistance or assistive devices within six minutes.

6 Modified independence: Patient is able to perform all five parts of activity safely without assistance but takes longer than six minutes or requires use of assistive device (i.e. slide board, grab bars, reacher, button hole closer, leans onto sink, raised toilet seat, etc.) However, use of wall is acceptable.

5 Supervision or Set up: Patient requires cueing or coaxing or standy by for safety to perform any 5 parts of task, or requires the set up (i.e. position of slide board, positioning of pants)

4 Minimal Assistance Patient requires assistance with 1 of 5 parts of the task.

3 Moderate Assistance: Patient requires assistance with 2 of 5 parts of the task.

2 Maximum Assistance: Patient requires assistance with 3 or more parts of the task.

1 Total Dependence: Patient unable to perform task or requires assistance of more than one person.
WHEELCHAIR TRANSFER--CAR

**Directions:** Propel wheelchair from one foot from car, open driver’s side car door, transfer into the car, put wheelchair into the car, take wheelchair out of the car, transfer out of the car into the wheelchair, close car door and move wheelchair to starting point. Perform activity as fast as you can.

**Performance requirements:** Need car (or mock car), mark with tape 12 inches from car passenger door for start and end point. Patient will 1) Open car door (includes positioning wheelchair inside open door), 2) transfer into car (includes wheelchair position, parts management, and self positioning), 3) bring wheelchair into car 4) bring wheelchair out of car 5) transfer out of car (includes wheelchair position, parts management, and self positioning), 6) close car door. Timing will begin at mark 12 inches from car and stopped at return to this mark.

7 Complete independence: Patient will perform all 6 parts of this task safely without assistance or assistive devices within 5 minutes.

6 Modified independence: Patient will perform all 6 parts of this task safely without assistance in greater than 5 minutes or requiring the use of assistive device that is not indigenous to the car (i.e. slide board, plastic bags on the seats, added grab bars, leg lifters, etc.)

5 Supervision or Set up: Patient requires cues or coaxing or stand by for safety to perform any 6 parts of this task or requires set up of equipment (i.e. positioning slideboard, positioning wheelchair) Set up does not include lifting the wheelchair into the car.

4 Minimal Assistance Patient requires assistance for 1-2 of the 6 parts of the task.

3 Moderate Assistance: Patient requires assistance for 3 of the 6 parts of the task.

2 Maximum Assistance: Patient requires assistance for 4 or more of the 6 parts of the task.

1 Total Dependence: Patient is unable to perform activity or requires the assistance of more than one person on any part of the task.
WHEELCHAIR TRANSFER--FLOOR

Directions: Start in wheelchair, get down to the floor (completely out of wheelchair), get back into wheelchair. You may perform this in any way you prefer. Perform activity as fast as you can.

Performance requirements: Need floor mat. Patient will 1) position wheelchair and self for transfer, 2) transfer down to floor, 3) position wheelchair and body position for return to wheelchair, 4) transfer from floor to edge of seat of wheelchair 5) position back into wheelchair. Timing will begin when patient starts from wheelchair to floor and ends when completely repositioned in wheelchair.

7 Complete independence: Patient will perform all 5 parts of task without assistance or assistive devices within 2 minutes.

6 Modified independence: Patient will perform all 5 parts of task without assistance but requiring greater than 2 minutes or requiring the use of an assistive device (i.e. a stool or furniture to use for transfer, leg straps.)

5 Supervision or Set up: Patient requires cues or coaxing or stand by for safety for any five parts of the task or set up of assistive devices such as stool or hold wheelchair to keep it from moving.

4 Minimal Assistance: Patient requires assistance for 1 of 5 parts of the task.

3 Moderate Assistance: Patient requires assistance for 2 of 5 parts of the task.

2 Maximum Assistance: Patient requires assistance for 3 or more of the 5 parts of the task.

1 Total Dependence: Patient is unable to perform task or requires the assist of more than one person for any part of the task.
TUB TRANSFER AND BATHING

**Description:** From your wheelchair transfer into shower or tub, demonstrate ability to turn on water, demonstrate washing and drying face, arms, hands, chest, stomach, front perineal area, back perineal area, upper legs, and lower legs including feet. Transfer out of tub or shower and return to wheelchair.

**Performance requirements:** Need tub or shower stall, available bath bench and tub transfer bench if needed for assistive device. Patient will 1) transfer into tub or shower stall in any technique they wish (includes management of wheelchair parts and positioning), 2) turn on water 3) wash and dry face, arms, and hands, 4) wash and dry chest stomach, and front perineal area, 5) wash and dry back perineal area, 6) wash and dry upper and lower legs including feet, 7) transfer out of shower or tub to wheelchair (includes management of wheelchair parts and positioning). Timing will begin at initial start of transfer to shower or tub and end when returned to wheelchair and repositioned. This activity does not included dressing and undressing.

**7** Complete independence: Patient performs all 7 parts of task without assistance and without use of assistive devices in under 15 minutes.

**6** Modified independence: Patient performs all 7 parts of task without assistance in greater than 15 minutes or requires the use of assistive device (bath/tub bench, shower chair, slide board, grab rails, etc). A long handled shower sponge is not included as an assistive device. The use of the wall is not considered an assistive device.

**5** Supervision or Set up: Patient requires cueing or coaxing to perform any 7 parts of task or requires set up including placement or holding of shower/tub bench, slide board set up, gathering of bathing items, or stand by for safety.

**4** Minimal Assistance: Patient requires assistance with 1-2 of the 7 parts of the task and set up of another task.

**3** Moderate Assistance: Patient requires assistance with 3-4 of the 7 parts of the task.

**2** Maximum Assistance: Patient requires assistance with 5 or more parts of the task.

**1** Total Dependence: Patient is unable to perform task or requires assistance of more than one person.
TUB TRANSFER AND BATHING (CONTINUED)

Videotape addendum: This test is designed to be evaluated with actual bathing. However for videotaping purposes, simulated bathing will be performed. Patient will be evaluated as follows: Patient will 1) transfer into tub in any technique they wish (includes management of wheelchair parts and positioning), 2) demonstrate ability to reach water faucet to turn on water, 3) access upper body, 4) access middle of trunk and front perineal area, 5) back perineal area, 6) upper legs, 7) lower legs and feet.
It is acceptable to cue for areas to clean in simulated bathing, as the simulated bathing is not as automatic as actual bathing.
STAIRS

**Description:** Go up and down 14 steps with wheelchair in any way that you feel comfortable. Do not use the handrail if you do not need it. Perform activity as fast as you can.

**Performance requirements:** Need one flight of 14 steps with hand rail. Pt will 1) bump up the stairs 2) manage wheelchair up the stairs, 3) bump down the stairs, 4) manage wheelchair down the stairs. Timing will begin at bottom of stairs with patient in the wheelchair and end at bottom of the stairs when patient is repositioned back in wheelchair.

7 Complete independence: Patient performs all 4 parts of task without assistance and without the use of an assistive device (i.e. hand rail, stool, etc.) in 10 minutes.

6 Modified independence: Patient performs all 4 parts of task without assistance in greater than 10 minutes or require the use of an assistive device.

5 Supervision or Set up: Patient requires cues or coaxing, or stand by for safety to perform any 4 parts of task or set up (i.e. positioning wheelchair, stool, etc.) Does not include carrying wheelchair up/down for patient.

4 Minimal Assistance: Patient requires assistance for 1 of 4 parts of task.

3 Moderate Assistance: Patient requires assistance for 2 or 4 parts of task.

2 Maximum Assistance: Patient requires assistance for 3 or more parts of task.

1 Total Dependence: Patient is unable to perform task or requires assistance of more than one person.
DRESSING -- UPPER AND LOWER BODY DRESSING

**Directions:** Get dressed in any position that you wish. Male: Put on T-shirt, button down shirt, underwear, pants, socks, shoes. Female: Put on bra, T-shirt, button down shirt, underwear, pants, socks, shoes. Perform the activity in any position or order that you wish, perform as fast as you can.

**Performance requirements:** Need the following assortment of the patient’s clothes: T-shirts, button down shirt, underwear, pants (zipper front), socks, and shoes. (A bra for women). Patient will 1) don prosthesis, orthosis, or assistive equipment (leg straps) if appropriate, 2) don underwear garments (includes fastening bra) and pants, 3) don T-shirt 4) don button down shirt, 5) don socks, 6) don shoes. Timing begins at beginning of dressing sequence starting from wheelchair. (If patient needs to transfer to bed, this will be included in the timing as it is part of his/her dressing routine, however, the transfer will not be scored.)

7 Complete independence: Patient able to perform all 6 parts of task safely without assistance and without use of an assistive device in 10 minutes (male) and 12 minutes (female).

6 Modified independence: Patient able to perform all 6 parts of task safely without assistance in greater than 10 minutes (male) and 12 minutes (female) or requires the use of an assistive device (button hole closer, dressing stick, reacher, sock aid, zipper-pull, etc.) Does not include use of slide board if transferring (scored in transfer section).

5 Supervision or Set up: Patient requires coaxing or cues or standby for safety to perform any 6 parts of task or requires set up of assistive equipment, assist gathering clothes, etc.

4 Minimal Assistance: Patient requires assistance with 1-2 of the 6 parts of the task.

3 Moderate Assistance: Patient requires assistance with 3 of the 6 parts of the task.

2 Maximum Assistance: Patient requires assistance with 4 or more of the 6 parts of the task.

1 Total Dependence: Patient is unable to perform activity or requires assistance of more than one person.

_Videotape addendum:_ For videotape purposes, underwear will not be evaluated in the dressing as it is too difficult to put on over clothes and result in inaccurate scoring and timing.
FUNCTIONAL MOBILITY TASKS-- REACHING, CARRYING, LIFTING, AND POURING

Directions: From your wheelchair take the water jug down from the shelf, take off the cap, fill it with water from the sink up to line, put the cap back on, carry the jug over to table, and pour the water into the glass up to the line on the table, put water jug back down onto table. Perform this as fast as you can.

Performance requirements: Have patient sitting upright in wheelchair fully flex shoulder to 160 degrees and measure height from tip of extended middle finger to floor and add 3 inches. This will be the height to place the water jug. Need empty one gallon water jug with cap mark line 1 inch from top, a sink at 30 inches from the floor, a table between 27-35 inches in height, an eight ounce glass with fill line one inch from the top of glass. The table will be positioned 30 feet from the sink. Patient will 1) reach for water jug and removing cap, 2) fill jug with water (includes manipulation of faucet) and replacing the cap, 3) lift jug out of sink, 4) carry jug of water to table, 5) fill glass with water up to fill line (includes management of weight of jug up and down). Timing will begin as patient starts to reach for jug and ends when jug is put down onto table after filling glass.

7 Completely Independent: Patient performs all 5 parts of task without assistance and without assistive devices in 3 minutes.

6 Modified Independence: Patient performs all 5 parts of task without assistance in greater than three minutes or requires the use of assistive device (i.e. modified faucet handle, reacher, etc)

5 Supervision or Set up: Patient requires cues or coaxing or stand by for safety to perform any 5 parts of task or requires set up (i.e. holding glass still, gathering adaptive equipment) This does not include reaching for the jug, manipulating the faucet, or lifting the jug of water. Theses are rated below.

4 Minimal Assistance: Patient requires assist with 1 of 5 parts of the task.

3 Moderate Assistance: Patient requires assistance with 2 of 5 parts of the task.

2 Maximal Assistance: Patient requires assistance with 3 or more parts of the task.

1 Total Dependence: Patient is unable to perform activity or requires assistance of more than one person.
FUNCTIONAL MOBILITY TASKS-- PICKING UP OBJECTS AND SWEPPING FLOOR

Directions: From your wheelchair pick up the two quarters and the sandbag off the floor and put them near the broom and dust pan. Get broom and dust pan, sweep the kitty litter into dustpan and pour into garbage can. When you finish sweeping put the broom and dust pan in starting position. Perform as fast as you can and stop when you feel the kitty litter has been cleaned up to your satisfaction.

Performance requirements: Need a standard kitchen broom, a dust pan, a waste basket with liner, 1/4 cup kitty litter, two quarters, and a 8 lb sandbag. Designate a 4 foot x 3 foot area to spread out kitty litter and place 2 quarters and the sandbag in the front of the area. Have a broom and dust pan placed against the wall just outside the marked area. The patient will 1) pick up the quarters, 2) pick up the sandbag, 3) get broom and dust pan, 4) sweep up kitty litter into piles, 5) transfer litter onto dust pan, 6) transfer litter from dust pan to wastebasket. Timing starts on “go”, the patient is positioned just outside the area and the time stops when patient returns dustpan and broom to the designated area.

7 Complete Independence: Patient performs all 6 parts of task without assistance and without assistive devices in 5 minutes.

6 Modified Independence: Patient performs all 6 parts of task without assistance in greater than 5 minutes or requires assistive devices to perform task (i.e. reacher, built up handles, etc.)

5 Supervision or Set up: Patient requires cues or coaxing or stand by for safety to perform any of the 6 parts of the task or requires set up (i.e. of adaptive equipment).

4 Minimal Assistance: Patient requires assistance with 1-2 of 6 parts of the task.

3 Moderate Assistance: Patient requires assistance with 3 of 6 parts of the task.

2 Maximal Assistance: Patient requires assistance with 4 or more parts of the task.

1 Total Dependence: Patient is unable to perform task or requires assistance of more than one person.