

**WHEELCHAIR SKILLS TEST QUESTIONNAIRE (WST-Q)[®]
VERSION 4.2 MANUAL**

This manual and related materials can be downloaded from:
www.wheelchairskillsprogram.ca/eng/testers.php

For further information, contact: *wsp@dal.ca*

ACKNOWLEDGEMENTS

This Manual, like the other materials in the Wheelchair Skills Program, has resulted from the work of many people. Those who have had the greatest involvement in this latest version constitute the Editorial and Advisory Committees. The membership of these Committees is shown below.

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TABLE OF CONTENTS

Acknowledgements.....	2
Table of Contents.....	3
1. Introduction.....	4
2. General Instructions.....	6
2.1 Scope.....	6
2.2 Test Subjects.....	6
2.3 Indications.....	6
2.4 Contraindications.....	6
2.5 Initial Interview.....	7
2.6 Time Limits.....	7
2.7 Versions of the WST-Q.....	7
2.8 Individual Skills.....	7
2.9 General Template for Individual Skill Questions.....	10
2.10 Scoring Algorithm for Individual Skill Questions.....	12
2.11 Calculated Scores.....	12
2.12 Forms.....	13
2.13 Options for How the WST-Q May be Administered.....	13

1. INTRODUCTION

A General Introduction to the Wheelchair Skills Program (WSP) can be found in a separate document, posted on the web-site. The WSP includes the Wheelchair Skills Test (WST), the Wheelchair Skills Training Program (WSTP) and related materials.

WSP documents are regularly updated on the basis of experience with them and questions posed by users of the material. As such, the WSP documents are “living” rather than fixed. Most of the refinements are merely to clarify meaning and would have little effect on scoring. However, for academic purposes, users of the WSP documents should cite the date of the version that they use. This can be found in the footer of each page. Research evidence by the developers regarding the WSP can be found in the list of published papers on the web-site.

WST-Q Version 4.2 is different from WST-Q Version 4.1 in the following notable ways:

- The WST-Q Manual has been separated from the WST Manual.
- The skill set has evolved slightly.
- A scooter version has been added.
- Some of the skills have been renamed to make them easier to understand.
- The separate scoring for safety has been eliminated.
- The capacity scoring for individual skills has been revised to permit an intermediate option between “yes” and “no”.
- The performance scoring for individual skills has been revised to permit scoring on the basis of the frequency of performance.
- A new option facilitates the identification of goals for training.
- A computer-assisted testing option has been added.

The WST-Q is a standardized evaluation method that permits a set of representative wheelchair skills to be simply and inexpensively documented. This test is intended to assess a specific person in a specific wheelchair in a standardized manner.

As an outcome measure, the WST-Q has some advantages over the objective WST, as well as some limitations (Table 1). There is fairly good documentation that the total WST-Q and WST scores are highly correlated, although the WST-Q values tend to be slightly higher.

The advantages of the WST-Q include that it requires less time, equipment and space to perform, it does not appear to induce a training effect (like the objective WST seems to do), it avoids a training-to-the-test effect, it allows one to assess performance as well as capacity (in ICF terms), it is more realistic (relating as it does to the subject’s own setting), it is not subject to limitations due to missing equipment (e.g. battery charger) at the time of testing, subjects are not likely to fail a skill on a technicality (e.g. a wheel slightly over a line), the settings are less specifically defined and the WST-Q may be the only option for situations in which objective testing is impractical or impossible

(e.g. during telephone follow-up interviews). The WST-Q can be administered by phone, postal questionnaire or on-line. It can be completed by a proxy. There is no risk of injury.

The limitations of the WST-Q are that the tester must rely on the subject's ability to understand the questions and to communicate valid answers. This limitation can be offset by having a proxy (e.g. a caregiver) who knows the subject well or a translator assist in providing the answers. There is potential for the subject to overestimate or underestimate his/her capacity and performance. The WST-Q does not provide any detail about *how* the skills are performed, limiting its usefulness as a guide to training solely on this basis. However, as training begins, the skills can be objectively assessed and the training program can be modified accordingly. The WST-Q can be used to monitor the progress and outcome of training.

Table 1. Comparison of WST and WST-Q Advantages and Limitations

Consideration	WST	WST-Q
Time to administer	~30 minutes	~10 minutes
Obstacles needed	Yes	No
Space needed	~1000 square feet	None
Induces a training effect	Probable (~5%)	None known
Can assess capacity (<i>can do</i>)	Yes	Yes
Can assess performance (<i>does do</i>)	No	Yes
Simulated vs real setting	Simulated usually	Real
Affected by missing equipment	Yes	No
Likelihood of failing a skill on a technicality	Occasional	None
Degree of specificity of settings	High	Low
Possibility of a testing error	Occasional	Rare
Can be administered by phone	No	Yes
Can be administered by mailed questionnaire	No	Yes
Can be administered on-line	No	Yes
Can be completed by a proxy	No	Yes
Requires ability to follow instructions	Yes	No
Requires ability to communicate	No	Yes (unless proxy)
Potential to misrepresent functional level	Low	Slightly greater
Total scores	Slightly lower	Slightly higher (~4%)
Provides detail about <i>how</i> the skills are performed	Yes	No
Risk of injury	Minimal	None

2. GENERAL INSTRUCTIONS

2.1. Scope

The WST-Q is intended for manual or powered wheelchairs, operated by wheelchair users or caregivers. The WST-Q can also be used for scooters operated by their users. Whenever appropriate in this document, the word “wheelchair” it should be understood to include scooters. The skills chosen for inclusion in the WST-Q are intended to be representative of the range of skills that wheelchair users and/or caregivers may need to regularly perform, varying from the most basic to more difficult. However, it would be impossible to be all-inclusive without making the size of the WST-Q unmanageable. The WST-Q is not intended to be an adequate measure of other important wheelchair skills (e.g. maintenance and repair skills), more extreme skills (e.g. some wheelchair sport activities) or community-integration activities that combine a number of skills (e.g. use of accessible transport, shopping).

2.2. Test Subjects

In this Manual, we have sometimes used the term “subject” as the most generic term possible, given that the person who is the object of testing may be a wheelchair user, a caregiver, a health-care student or a research participant. In addition to the scores that can be provided for a wheelchair user and a single caregiver separately, the WST-Q may be used to assess the extent to which one or more caregivers and a wheelchair user can function as a team; the “test subject” in such situations is the combination of the wheelchair user and the caregiver(s). The nature of the test subject(s) should be recorded. Unless otherwise specified, the assumption is that it is a single wheelchair user operating alone or a single caregiver operating alone who is the test subject. If an animal (e.g. a service dog) is used to assist with a skill, the animal is considered an “aid” rather than a caregiver.

2.3. Indications

For clinical purposes, the WST-Q can be used early in the course of a rehabilitation program as a diagnostic measure, especially to determine which (if any) skills might be addressed during the rehabilitation process (e.g. by training or wheelchair changes). By repeating the test on completion of the rehabilitation phase (or later during follow-up), the WST-Q can be used as an outcome measure. The WST-Q may also be used for program evaluation, to answer research questions and to assist in wheelchair design.

2.4. Contraindications

The WST-Q is only valid if the subject is able to communicate. As a screening procedure, the tester should ask the potential subject about information (e.g. date of birth, diagnosis, length of time using a wheelchair, and time up in the wheelchair each day) that can be confirmed by chart review, the nursing staff or family members. It is acceptable for a proxy (e.g. a caregiver or family member) who knows the subject well to answer on behalf of the subject. A translator may be used if the test subject is not fluent in the language in which the WST-Q is being administered.

2.5. Initial Interview

Wheelchair skills assessment in the clinical context usually takes place as part of a broader evaluation of the wheelchair user's health, function and context. Prior to beginning WST-Q testing, the tester should screen the test subject for the ability to communicate and should obtain consent to proceed. If appropriate, demographic, clinical and wheelchair-related data are recorded on the appropriate forms. These data may be obtained from the wheelchair user, the caregiver and/or the health record.

2.6. Time Limits

There is no formal upper time limit for the WST-Q and rests are permitted. However, it is recommended that the WST-Q be completed at a single sitting. This does not usually present much of a problem because the average time to complete the WST is 10 minutes or less. If the testing is conducted on more than one day, the tester should document the dates.

2.7. Versions of WST-Q

There are five versions of the WST-Q (Table 2). Which version should be used in a specific instance is based on the type of wheelchair and the nature of the test subject. Table 3 shows the individual skills for each version.

Table 2. Versions of WST-Q by Type of Wheelchair and Nature of the Test Subject

Type of Wheelchair	Type of Test Subject
Manual	Wheelchair user
	Caregiver
Powered	Wheelchair user
	Caregiver
Scooter	Scooter user

There are different formats for each version, depending upon how the questions are posed (e.g. by a tester reading them to the wheelchair user or a wheelchair user reading the questions him/herself) and how the answers are recorded (e.g. hand-written on the WST-Q Form or using computer-assisted testing).

2.8. Individual Skills

The individual skills (Table 3) are the units of assessment. A brief description of each skill and the rationale for including it in the WST-Q can be found in the section on individual skills of the WST Manual (see website). In naming the individual skills, we have attempted to be as generic and universal as possible. This is in recognition that the environments in which wheelchairs are used vary widely around the world, although they share many common characteristics. The WST-Q and the WST both use the same skill set, but the correspondence should not be considered exact. The WST, by its nature, deals with reasonably exact dimensions (e.g. rolls forwards [10 m]). Because test subjects may not be able to easily visualize such exact distances, the WST-Q questions are stated in more general terms (e.g. the ability to roll forwards a short distance).

The order of skills in Table 3 reflects the functional groupings of skills and the approximate order of difficulty (although this can vary depending upon the subject and wheelchair). Although somewhat arbitrary, it is possible, on the basis of difficulty, to roughly group skills into three levels – indoor, community and advanced. This can be helpful for communicating with others, for planning therapies and for justifying the purchase of different types of wheelchairs. Which skills have been assigned to which levels is indicated in Table 3.

Table 3: WST and WST-Q 4.2 List of Individual Skills

#	Skill Level	Individual Skill Names		Manual WC		Powered WC		Scooter
		WST	WST-Q	WCU	CG	WCU	CG	SU
1.	Indoor	Moves controller/tiller away and back	Moves controller away and back	X	X	✓	✓	✓
2.	Indoor	Turns power on and off	Turns power on and off	X	X	✓	✓	✓
3.	Community	Selects drive modes and speeds	Selects drive modes and speeds	X	X	✓	✓	✓
4.	Indoor	Operates body positioning options	Operates body positioning options	X	✓	✓	✓	✓
5.	Indoor	Disengages and engages motors	Disengages and engages motors	X	X	✓	✓	✓
6.	Indoor	Operates battery charger	Operates battery charger	X	X	✓	✓	✓
7.	Indoor	Rolls forwards (10 m)	Rolls forwards short distance	✓	✓	✓	✓	✓
8.	Indoor	Rolls backwards (2 m)	Rolls backwards short distance	✓	✓	✓	✓	✓
9.	Indoor	Turns while moving forwards (90°)	Turns while moving forwards	✓	✓	✓	✓	✓
10.	Indoor	Turns while moving backwards (90°)	Turns while moving backwards	✓	✓	✓	✓	✓
11.	Indoor	Turns in place (180°)	Turns in place	✓	✓	✓	✓	✓
12.	Indoor	Maneuvers sideways (0.5 m)	Maneuvers sideways	✓	✓	✓	✓	✓
13.	Indoor	Gets through hinged door	Gets through hinged door	✓	✓	✓	✓	✓
14.	Indoor	Reaches high object (1.5 m)	Reaches high object	✓	X	✓	X	✓

#	Skill Level	Individual Skill Names		Manual WC		Powered WC		Scooter
		WST	WST-Q	WCU	CG	WCU	CG	SU
15.	Indoor	Picks object up from floor	Picks object up from floor	✓	X	✓	X	✓
16.	Indoor	Relieves weight from buttocks (3 sec)	Relieves weight from buttocks	✓	✓	✓	✓	X
17.	Indoor	Transfers to and from bench	Transfers to and from bench	✓	✓	✓	✓	✓
18.	Community	Folds and unfolds wheelchair	Folds and unfolds wheelchair	✓	✓	X	X	✓
19.	Community	Rolls 100 m	Rolls longer distance	✓	✓	✓	✓	✓
20.	Community	Avoids moving obstacles	Avoids moving obstacles	✓	✓	✓	✓	✓
21.	Community	Ascends 5° incline	Ascends slight incline	✓	✓	✓	✓	✓
22.	Community	Descends 5° incline	Descends slight incline	✓	✓	✓	✓	✓
23.	Advanced	Ascends 10° incline	Ascends steep incline	✓	✓	✓	✓	✓
24.	Advanced	Descends 10° incline	Descends steep incline	✓	✓	✓	✓	✓
25.	Community	Rolls across side-slope (5°)	Rolls across side-slope	✓	✓	✓	✓	✓
26.	Community	Rolls on soft surface (2 m)	Rolls on soft surface	✓	✓	✓	✓	✓
27.	Community	Gets over gap (15 cm)	Gets over gap	✓	✓	✓	✓	✓
28.	Community	Gets over threshold (2 cm)	Gets over threshold	✓	✓	✓	✓	✓
29.	Community	Ascends low curb (5 cm)	Ascends low curb	✓	✓	✓	✓	✓
30.	Community	Descends low curb (5 cm)	Descends low curb	✓	✓	✓	✓	✓
31.	Advanced	Ascends curb (15 cm)	Ascends high curb	✓	✓	X	X	X
32.	Advanced	Descends curb (15 cm)	Descends high curb	✓	✓	X	X	X
33.	Advanced	Performs stationary wheelie (30 sec)	Performs stationary wheelie	✓	✓	X	X	X

#	Skill Level	Individual Skill Names		Manual WC		Powered WC		Scooter
		WST	WST-Q	WCU	CG	WCU	CG	SU
34.	Advanced	Turns in place in wheelie position (180°)	Turns in place in wheelie position	✓	✓	X	X	X
35.	Advanced	Descends 10° incline in wheelie position	Descends steep incline in wheelie position	✓	X	X	X	X
36.	Advanced	Descends curb in wheelie position (15 cm)	Descends high curb in wheelie position	✓	X	X	X	X
37.	Advanced	Gets from ground into wheelchair	Gets from ground into wheelchair	✓	✓	✓	✓	X
38.	Advanced	Ascends stairs	Ascends stairs	X	✓	X	X	X
39.	Advanced	Descends stairs	Descends stairs	✓	✓	X	X	X

Abbreviations and symbols: WC = wheelchair, WCU = wheelchair user, CG = caregiver, SU = scooter user, ✓ = included, X = not included

2.9. General Template for Individual Skill Questions

For individual skills, the initial question is about capacity (“Can you do this skill?”). The answer options are “yes”, “yes, with difficulty”, “no” or “not possible”. If an answer of “yes” is given, this is considered equivalent to a “pass” score on the objective test and a score of “2” is recorded. If an answer of “yes, with difficulty” is given, this is considered equivalent to a “pass with difficulty” score on the objective test and a score of 1 is recorded. If an answer of “no” is given, this is considered equivalent to a “fail” score on the objective test and a score of “0” is recorded. The “not possible” option is only presented when the skill (e.g. folds and unfolds wheelchair) is one that requires the wheelchair to have a part that permits the skill. If the answer “not possible” is chosen, a score of “NP” (not possible) is recorded.

The next question about each individual skill is about performance (“How often do you actually do this skill during your daily life?”). If the answer is “no” for the capacity question, the performance question is not asked for that skill. The performance answer options are “daily” (generally, at least once a day, score of 4), “weekly” (generally, at least once a week, score of 3), “monthly” (generally, at least once a month, score of 2), “yearly” (generally, at least once a year, score of 1) or “never” (generally, less often than once a year or never, score of 0). We recognize that limitations of subject recall may affect the validity of the answers when considering longer periods like a year. However, we chose the year threshold to avoid missing skills that are only performed infrequently due to seasonal variations.

WST-Q performance is related to WST-Q capacity, but is also related to personal factors (e.g. age, confidence) and the environment (e.g. weather, architectural barriers, opportunity). Therefore, capacity scores tend to exceed performance scores. Theoretically, the converse could occur – for

instance, if a wheelchair user had an acute injury (e.g. a fractured wrist), he/she might be unable to perform a skill currently that he/she had performed frequently in the past. However, there is no guarantee in such a circumstance that the wheelchair user will ever get back to the earlier level of performance. Therefore, for the purposes of the WST-Q, if the score for capacity is 0, the score for performance is also 0. The answer options and definitions are summarized in Table 4.

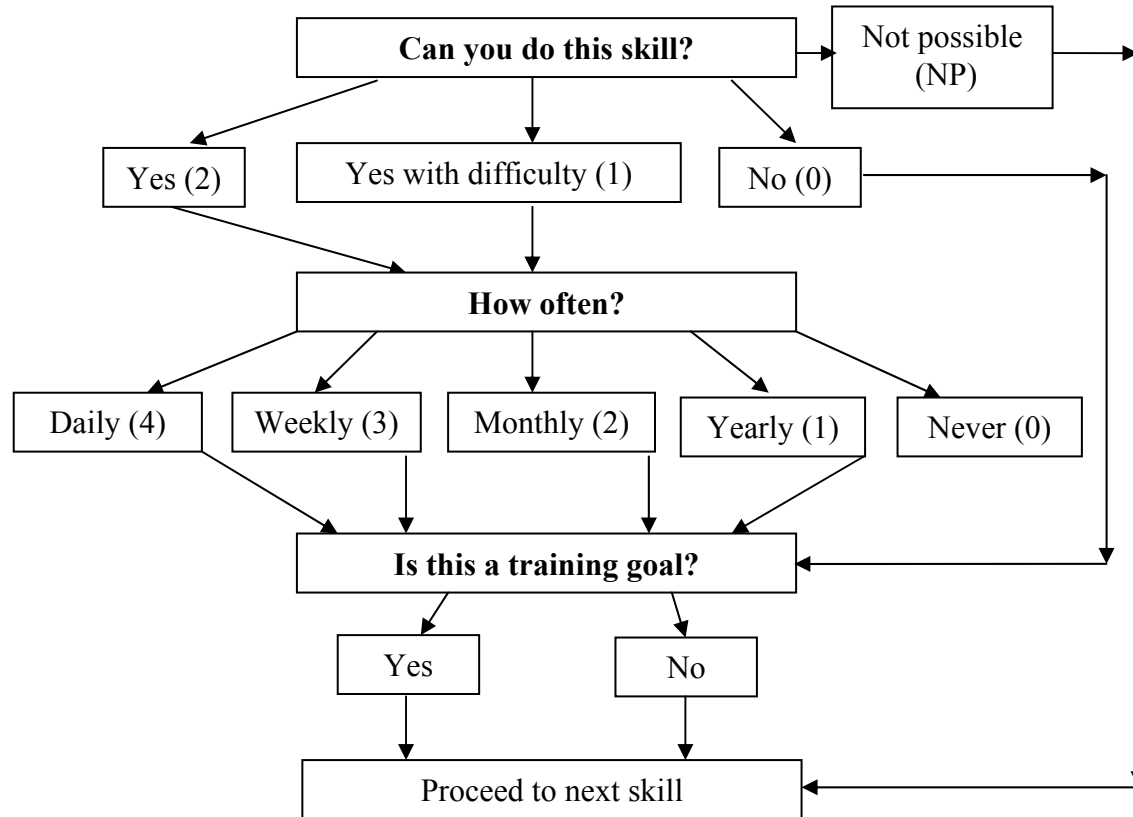
Table 4. Answer Options and Definitions for Each Skill

Capacity question: “Can you do this skill?”		
Answer	Score	What this means
Yes	2	I can safely do the skill, by myself, without any difficulty.
Yes with difficulty	1	Yes, but not as well as I would like.
No	0	I have never done the skill or I do not feel that I could do it right now.
Not possible	NP	My wheelchair does not have the parts to allow this skill. (This option is only presented for skills where a NP score is a possibility.)
Performance question: “How often do you actually do this skill during your daily life?”		
Answer	Score	What this means
Daily	4	Generally, at least once a day.
Weekly	3	Generally, at least once a week.
Monthly	2	Generally, at least once a month.
Yearly	1	Generally, at least once a year.
Never	0	Generally, less often than once a year or never.

If, at the beginning of the WST-Q, it is decided by the tester or subject that one purpose of the WST-Q is to identify potential training goals then, before the assessment of individual skills, the subject is also asked if there are any specific wheelchair skills on which he/she would be interested in receiving training. Doing this before asking about the individual skills is intended to reduce the likelihood of “training to the test”. After the capacity and performance questions have been answered (regardless of the scores recorded), the final question for each skill is “Would you like to receive training for this skill?” The answer options are “yes” or “no”. On completion of the assessment of individual skills, the subject is asked if there are any other skills on which he/she would be interested in receiving training. For those going through this goal-setting option, the list of skills that the subject had identified as ones that he/she is interested in pursuing further are included in the WST-Q Form. This list can be used by the trainer to assist in choosing the skills for training and prioritizing them. Goal setting is an important component of the WSTP and is dealt with in more detail in the WSTP Manual.

2.10. Scoring Algorithm for Individual Skill Questions

The algorithm for the individual skill questions is shown below.



2.11. Calculated Scores

The following scores can be calculated by hand (as described below) or by using the software that is part of the computer-assisted testing option. Subtracting the number of NP (not possible) scores from the denominator avoids penalizing test subjects by the inclusion of skills that would be impossible to complete.

1. **Total Capacity WST-Q Score (%):** The numerator is the total raw capacity score (i.e. the sum of the individual skill scores) and the denominator is the total possible raw capacity score (i.e. the total number of skills minus the number of skills awarded NP [not possible] scores x 2). 100% is the maximum possible percentage score.

$$\text{Total Capacity Score} = \frac{\text{sum of individual skill scores}}{([\text{number of possible skills} - \text{number of NP scores}] \times 2)} \times 100\%$$

2. **Total Performance WST-Q Score (%):** The numerator is the total raw performance score (i.e. the sum of the individual skill scores) and the denominator is the total possible raw performance score (i.e. the total number of skills minus the number of skills awarded NP [not possible] scores

x 4). 100% is the maximum possible percentage score.

Total Performance Score = $\frac{\text{sum of individual skill scores}}{([\text{number of possible skills} - \text{number of NP scores}] \times 4)} \times 100\%$

3. **Goal Attainment Score (%):** The Goal Attainment Score (GAS) is of use when there is only a limited set of the skills that are addressed, such as through wheelchair modifications or training. The numerator is the number of skills that are met and the denominator is the number of goals set. 100% is the maximum possible percentage score.

Goal Attainment Score = $\frac{\text{number of goals met}}{\text{number of goals set}} \times 100\%$

4. **Special Purpose Score (optional):** Any subset of individual skills may be selected for a calculated subtotal percentage score. For instance, the scores for individual skill levels (i.e. Indoor, Community and Advanced) can be calculated.

2.12. Forms

The forms that facilitate the administration, recording and reporting of each of the five versions of the WST-Q (see website). The completed WST-Q Form includes identifying data, the scores for individual skills, the calculated scores, comments and, if appropriate, the skills for which the subject would be interested in receiving training.

2.13. Options for How the WST-Q May be Administered

The WST-Q may be administered in person or by telephone with the tester reading the instructions and questions (see website) and recording the answers. Alternatively, the WST-Q may be self-administered (e.g. in a postal or on-line questionnaire) with the test subject or proxy reading the questions and recording the answers. Another option is for computer-assisted testing. The tester or test subject reads the questions on the computer monitor or equivalent and provides answers to each of the questions. Advantages of this approach are that instances of missing data and transcription errors are minimized. Also, it requires less time to complete the WST-Q in this way because the computer uses the scoring algorithm automatically. For instance, if the test subject answers “no” to a question about skill capacity, there is no need to ask the question about skill performance because an automatic score of 0 is awarded. Similarly, if the test subject answers “no” to a question about an easy version of a skill (e.g. ascends slight incline), there is no need to answer the questions about the more difficult version of the same skill (e.g. ascends steep incline). Automatic scores of 0 are awarded for the more difficult skills and those questions are skipped.