

# **Power-Mobility Indoor Driving Assessment Manual (PIDA)**

Deirdre R. Dawson, PhD, OT Reg. (ON)  
Ethel Kaiserman-Goldenstein, BOT, OT Reg. (ON)  
Roberta Chan, MSc, OT Reg. (ON)  
Janet Gleason, MSc, OT Reg. (ON)

## **ACKNOWLEDGEMENTS:**

The development of the Power-mobility Indoor Driving Assessment and the manual was made possible with the enthusiastic support of a great many individuals. The PIDA was developed in collaboration with the Department of Occupational Therapy, Extended Care Division, at the Sunnybrook Health Science Centre, Toronto, Canada (now Sunnybrook & Women's College Health Sciences Centre). The following occupational therapists were involved: Rebecca Bair-Patel, Cathy Balsdon, Bev Moskovic, Eunice Podolski, Barbara Skulko, and Ruth Young. The additional efforts made by a number of these individuals needs special mention. Cathy Balsdon and Barbara Skulko were involved in the data collection for the reliability study. Barbara Skulko and Ruth Young provided editorial comments on the entire manual. The authors express their gratitude to each of these individuals.

We would also like to thank occupational therapists across Canada who participated in a mailed survey as part of the content validation for the PIDA. Their comments were invaluable.

Finally, we would like to acknowledge the Ontario Society of Occupational Therapists' Research Fund. The research on the PIDA was accomplished in part through their financial support.

## INTRODUCTION

The Power-mobility Indoor Driving Assessment (PIDA) is a valid and reliable assessment designed to assess the indoor mobility of persons who use power chairs or scooters and who live in institutions.

The instrument was developed to be used clinically, to guide intervention plans. It was designed with two purposes in mind; to describe and evaluate. That is, it has been designed to describe an individual's mobility status at a single point in time indicating where and how interventions may be made and it was designed to evaluate change over time. Thus, it should register improvement following an intervention, for example a training program or environmental modification.

The instrument has been designed to measure only mobility status and not the level of function on other self-care activities. Thus, in a number of places in the assessment the client is asked to approach an object in preparation for using it (e.g. toilet) but actual use of it (transfer, hygiene) is not tested. Self-care activities should be covered in a more specific self-care assessment, for example the Functional Independence Measure or the Barthel Index.

The PIDA's design reflects occupational therapy theory. In *Toward outcome measures in occupational therapy*<sup>1</sup> it is clearly stated that performance should be measured in relation to the environment and roles. This assessment reflects this by scoring clients only on items that are in their environment and/or are necessary for them to do. The "not applicable" category provides the PIDA with the client-centered focus, which is an integral part of occupational therapy.

The rigorous development included an extensive literature review, review of other assessments, and feedback from occupational therapists across Canada. This methodology established the content validity of the PIDA. Test-re-test reliability and inter-rater reliability were confirmed using fifteen drivers and three occupational therapists as raters. The intra-class correlation coefficient for test-re-test reliability was 0.67 ( $p < 0.001$ ), and for inter-rater reliability 0.87 ( $p < 0.001$ ). Please refer to the published research results for further details.<sup>2</sup>

Prior to administering the PIDA, the Mobility Device and Driver Experience Checklist (pp. 4-5) should be completed. As well, it is advisable to allow clients to practice all assessment items (**except item 30, "unexpected obstacle"**). This will ensure that in a re-test situation real change is being evaluated rather than simply an increased familiarity with the assessment.

In analyzing the results of the PIDA, the occupational therapists at the Sunnybrook Health Science Centre have often found it helpful to have information from visual-perceptual and cognitive assessments available to them. This information has been useful in making recommendations for device and environment modifications and for planning training programs. However, it should be noted that the therapists have had

many experiences with clients who have visual-perceptual and/or cognitive impairments, yet have satisfactorily completed the PIDA and drive independently within the facility.

<sup>1</sup>Department of National Health and Welfare, & Canadian Association of Occupational Therapists (1987). *Toward outcome measures in occupational therapy*. Ottawa: National Health and Welfare.

<sup>2</sup>Dawson, D., Chan, R., & Kaiserman, E. (1994). Development of the Power-mobility Indoor Driving Assessment for residents of long term care facilities. *Canadian Journal of Occupational Therapy*, 61, 269-276.

**POWER-MOBILITY INDOOR DRIVING ASSESSMENT  
MOBILITY DEVICE AND DRIVER EXPERIENCE CHECK LIST**

Driver Name: \_\_\_\_\_

Assessment Date: \_\_\_\_\_

Assessor's Name: \_\_\_\_\_

**TYPE OF MOBILITY DEVICE:**

- Trial device:  Client owned:
- Make and model: \_\_\_\_\_
- Seating system: \_\_\_\_\_
- Type of controls: \_\_\_\_\_
- Special adaptations: \_\_\_\_\_

**USE OF DEVICE SAFETY ACCESSORIES:**

Please check all accessories that are currently used. Indicate those that are needed with a star.

- |                        |                       |                    |
|------------------------|-----------------------|--------------------|
| _____ flag             | _____ lights          | _____ anti-tippers |
| _____ reflectors       | _____ seat belt       | _____ horn         |
| _____ rear view mirror | _____ other (specify) |                    |

Is the driver able to explain or demonstrate how each accessory is used: YES  NO

**DRIVING EXPERIENCE:**

- Years \_\_\_\_\_
- Devices used currently/in the past \_\_\_\_\_
- Environment/facility (briefly describe) \_\_\_\_\_

**CAN THE CLIENT...**

- |                                   |     |    |       |
|-----------------------------------|-----|----|-------|
| • Turn device on/off              | YES | NO | N / A |
| • Utilize braking system          | YES | NO | N / A |
| • Disengage braking system        | YES | NO | N / A |
| • Use speed control switch        | YES | NO | N / A |
| • Use special features of device  | YES | NO | N / A |
| • Request assistance if necessary | YES | NO | N / A |
| • Independent transfer on/off     | YES | NO | N / A |

If no, describe transfer: \_\_\_\_\_

Sitting tolerance: \_\_\_\_\_

**COMMENTS AND OTHER RELEVANT INFORMATION:**

## ASSESSMENT SCORING

Each item on the Power-mobility Indoor Driving Assessment (PIDA) is scored as follows:

- 4 Completely independent: optimal performances, able to perform task in one attempt smoothly and safely.
- 3 Completes task hesitantly, requires several tries, requires speed restriction, and/or bumps walls, objects etc. lightly (without causing harm).
- 2 Bumps objects or people in a way that causes or could cause harm to the client, other persons, or to objects
- 1 Unable to complete task – reason: \_\_\_\_\_ . For example, may require verbal and/or visual cues or physical assistance.

$$\text{Total Score} = \frac{\text{Sum of scores for each applicable item} \times 100}{4 \times (\text{Number of applicable items})} = \text{_____} \%$$

Please note: The total score does not represent a percentage of normal. Rather, it provides a number which may facilitate comparing performance over time.

**POWER-MOBILITY INDOOR DRIVING ASSESSMENT (PIDA)  
INSTRUCTIONS AND SCORING CRITERIA**

**BEDROOM**

**1. Accessing Bed from Client's Right Side:**

Instructions: "Please park on the right side of the bed so that you can move from the chair to the bed directly."

Criteria: Ability to manoeuvre wheelchair to access bed for transfer. Depending on type of transfer used, client may need to touch bed.

**2. Accessing Bed from Client's Left Side:**

Instructions: "Please park on the left side of the bed so that you can move from the chair to the bed directly."

Criteria: Ability to manoeuvre wheelchair to access bed for transfer. Depending on type of transfer used, client may need to touch bed.

**3. Approaching the Dresser:**

Instructions: "Please approach your dresser as if to open your top drawer or reach something from its surface."

Criteria: Ability to position oneself effectively to access the dresser drawers or reach something from the surface.

**4. Approaching Bedroom Closet:**

Instructions: "Please approach your closet as if you or someone else was going to open the door."

Criteria: Ability to position oneself effectively to open or allow someone else to open closet door.

**BATHROOM**

N.B. Test in the bathroom the client would normally use.

**5. Through Bathroom Doorway:**

Does the client normally open the bathroom door themselves? \_\_\_\_\_ YES \_\_\_\_\_ NO

Instructions if yes: "Please open the door and drive into the bathroom"

Instructions if no: "Please drive into the bathroom."

Criteria: Ability to open door, and drive into the bathroom navigating around the door if this is part of the normal routine.

6. **Approaching the Sink:**

Instructions: "Please approach the sink as if to use it."

Criteria: Ability to access the sink.

7. **Approaching the Toilet:**

Instructions: "Please position the chair as if you were going to use or move to the toilet."

Criteria: Ability to manoeuvre the vehicle in the bathroom for bowel and bladder management.

8. **Exiting the Bathroom:**

Does the client normally close the bathroom door themselves? \_\_\_\_ YES \_\_\_\_ NO

Instructions if yes: "Please leave the bathroom and close the door"

Instructions if no: "Please leave the bathroom."

Criteria: Ability to exit the bathroom and close the door if this is part of the normal routine.

**DOORS**

9. **Automatic Sliding Doors-mat trigger:**

Instructions: "Please drive through the doorway"

Criteria: Ability to go through the doorway changing speed if necessary.

10. **Automatic Swing Open (towards the person) Doors – "mat trigger"**

Instructions: "Please drive through the doorway"

Criteria: Ability to leave space for door to open and go through the doorway changing speed if necessary

11. **Automatic Doors – button trigger:**

Instructions: "Please push the button and drive through the doorway."

Criteria: Ability to push the button and go through the doorway.

12. **Narrow Regular Doors:** N.B. This item is tested on the narrowest door the client uses.

Does the client normally open this door? \_\_\_\_ YES \_\_\_\_ NO

Instructions if yes: "Please open the door and drive through."

Instructions if no: "Please drive through this doorway."

Criteria: Ability to go through the doorway, opening the door first if this is routine.



## ELEVATOR

N.B. Before beginning this portion of the test, advise the client that if they need assistance with the elevator button or door they are expected to ask for it.

### 13. **Entering Door:**

Instructions: "Please enter the elevator."

Criteria: Ability to enter elevator. Therapist may hold the door if asked.

### 14. **Spacing in Elevator:**

Instructions: No instructions to the client. If there are no people in the elevator, therapist enters first. Observe client in the elevator.

Criteria: Ability to space self safely in the elevator.

### 15. **Exiting the Elevator:**

Instructions: "Please exit the elevator."

Criteria: Ability to exit the elevator. If exiting in reverse, client is expected to look around to ensure nothing is in the way. Therapist may hold the door if asked.

## PARKING

### 16. **Parking at a Table with Limited Space:**

Instructions: "Please park under that table."

Criteria: Ability to park in a one metre (3 feet) space at a table, either between two persons or between 1 person and a table leg, without knocking another or the table. The table should be one normally used by the client and the comment should indicate the type of table tested.

### 17. **Parking beside a Table:**

Instructions: "Please park beside that table close enough to enable you to reach items on the table."

Criteria: Ability to park beside a table close enough to it to enable reaching items on the table. The table should be one normally used by the client and the comment should indicate the type of table tested.

### 18. **Back-in Parking:**

Instructions: "Please back in and park between the chairs."

Criteria: Ability to back in and park between two chairs spaced 1 metre (3 feet) apart and placed against a wall.

19. **Parallel Parking:**

Instructions: "Please parallel park between the chairs."

Criteria: Ability to parallel park between two chairs spaced 1½ metres (4½ feet apart and placed against a wall.

**RAMPS**

20. **Up the Ramp:**

Instructions: "Please drive up the ramp."

Criteria: Ability to drive up a ramp changing speed if necessary.

21. **Down the Ramp:**

Instructions: "Please drive down the ramp."

Criteria: Ability to drive down a ramp changing speed if necessary.

**SKILLED DRIVING**

22. **Turning right at 4-way intersection:**

Instructions: "Please turn right at this intersection."

Criteria: Client will slow down during approach to the 4-way intersection, check mirror and/or intersection for traffic, and proceed through the intersection with caution.

23. **Turning left at 4-way intersection:**

Instructions: "Please turn left at this intersection."

Criteria: Client will slow down during approach to the 4-way intersection, check mirror and/or intersection for traffic, and proceed through the intersection with caution.

24. **180°-Turn:**

Instructions: "Please do a 180° turn in this hallway."

Criteria: Ability to perform a 180° turn in a hallway no more than 2 metres (6 feet) wide.

25. **Driving Straight Backward:**

Instructions: "Drive backwards between the chairs and wall."

Criteria: Ability to drive 2 metres (6 feet) straight backwards in a controlled environment, that is through a 1 metre wide corridor created by chairs and a wall.

**26. Manipulating in a Congested Area:**

Instructions: “Please drive through the \_\_\_\_\_.”

Criteria: Therapist indicates the congested area through which the client is to navigate, e.g. facility cafeteria or lounge at a busy time. The test drive should be a minimum of 20 metres (65 feet). Therapist observes client’s ability to drive through a congested area which includes people moving about and stationary obstacles.

**27 Maneuverability** (Refer to Figure 1 – circles on Figure represent chairs):

Instructions: “Drive in and out between the chairs.”

Criteria: Ability to drive through a designated obstacle course without bumping any of the chairs.

**28 Unexpected Obstacles:**

Instructions: No instructions are given to the client.

*N.B. Forewarning the client will negate the value of this test. Persons driving mobility devices need to be able to respond to unexpected situations. Without warning, the therapist quickly throws an empty cardboard box less than 1 metre (3 feet) in front of client. This is done twice at any point during the assessment, while the client is driving forward.*

Criteria: Ability to stop the mobility device quickly without hitting the box.

**N.B. The final two items are observed throughout the test and should be scored at the end.**

**29. Speed Selection:**

Instructions: No instructions to the client. Observe throughout testing.

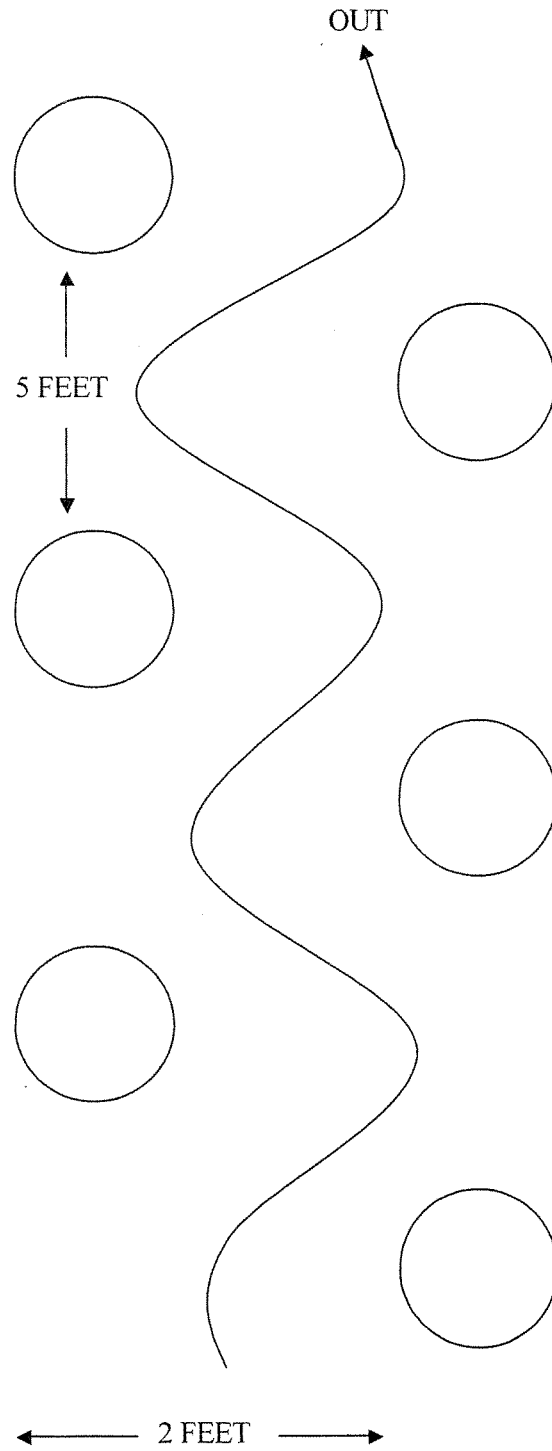
Criteria: Ability to choose safe speed(s) with respect to the environment.

**30. Sharing Public Spaces:**

Instructions: No instructions to the client. Observe throughout testing.

Criteria: Ability to share limited space appropriately, e.g. yields to pedestrians, moves out of the way of hospital carts.

Figure 1: MANEUVERABILITY



## POWER-MOBILITY INDOOR DRIVING ASSESSMENT: SCORE SHEET

Check all applicable items. Non applicable items should be marked with an "X" in the applicable and 'score' boxes.

### Scoring

- 4 Optimal performance: able to perform task in one attempt smoothly and safely.
- 3 Completes task hesitantly, requires several tries, requires speed restriction, and/or bumps walls, objects etc. lightly (without causing harm).
- 2 Bumps objects or people in a way that causes or could cause harm.
- 1 Unable to complete task.

<u>ITEM</u>	<u>Applicable</u>	<u>Score</u>	<u>Comment</u>
<b>BEDROOM</b>			
1. Accessing Bed – Right	<input type="checkbox"/>	<input type="checkbox"/>	_____
2. Accessing Bed – Left	<input type="checkbox"/>	<input type="checkbox"/>	_____
3. Approaching Dresser	<input type="checkbox"/>	<input type="checkbox"/>	_____
4. Approaching Closet	<input type="checkbox"/>	<input type="checkbox"/>	_____
<b>BATHROOM</b>			
5. Into Bathroom	<input type="checkbox"/>	<input type="checkbox"/>	_____
6. Approaching Sink	<input type="checkbox"/>	<input type="checkbox"/>	_____
7. Approaching Toilet	<input type="checkbox"/>	<input type="checkbox"/>	_____
8. Exit Bathroom	<input type="checkbox"/>	<input type="checkbox"/>	_____
<b>DOORS</b>			
9. Sliding Doors – mat trigger	<input type="checkbox"/>	<input type="checkbox"/>	_____
10. Swing Open Doors – mat trigger	<input type="checkbox"/>	<input type="checkbox"/>	_____
11. Automatic Doors – button trigger	<input type="checkbox"/>	<input type="checkbox"/>	_____
12. Regular Doors	<input type="checkbox"/>	<input type="checkbox"/>	_____
<b>ELEVATORS</b>			
13. Entering Elevator	<input type="checkbox"/>	<input type="checkbox"/>	_____
14. Spacing in Elevator	<input type="checkbox"/>	<input type="checkbox"/>	_____
15. Exiting Elevator	<input type="checkbox"/>	<input type="checkbox"/>	_____

<u>ITEM</u>	<u>Applicable</u>	<u>Score</u>	<u>Comment</u>
<b>PARKING</b>			
16. Parking under table	<input type="checkbox"/>	<input type="checkbox"/>	_____
17. Parking beside table	<input type="checkbox"/>	<input type="checkbox"/>	_____
18. Back-in Parking	<input type="checkbox"/>	<input type="checkbox"/>	_____
19. Parallel Parking	<input type="checkbox"/>	<input type="checkbox"/>	_____
<b>RAMPS</b>			
20. Up a Ramp	<input type="checkbox"/>	<input type="checkbox"/>	_____
21. Down a Ramp	<input type="checkbox"/>	<input type="checkbox"/>	_____
<b>SKILLED DRIVING</b>			
22. Turning Right	<input type="checkbox"/>	<input type="checkbox"/>	_____
23. Turning Left	<input type="checkbox"/>	<input type="checkbox"/>	_____
24. 180° Turn	<input type="checkbox"/>	<input type="checkbox"/>	_____
25. Driving Backwards	<input type="checkbox"/>	<input type="checkbox"/>	_____
26. Manipulating – Congested Area	<input type="checkbox"/>	<input type="checkbox"/>	_____
27. Maneuverability	<input type="checkbox"/>	<input type="checkbox"/>	_____
28. Obstacles – Unexpected	<input type="checkbox"/>	<input type="checkbox"/>	_____
N.B. The final two test items are observed throughout the test and should be scored at the end			
29. Speed Selection	<input type="checkbox"/>	<input type="checkbox"/>	_____
30. Sharing Public Space	<input type="checkbox"/>	<input type="checkbox"/>	_____

In your opinion is this client:	
Able to drive independently with no restrictions	_____
In need of training as he/she is only:	
Able to drive with some difficulty	_____
Able to drive with a great deal of difficulty	_____

**SCORING:**

TOTAL SCORE =  $\frac{\text{Sum of scores for each applicable item} \times 100}{4 \times (\text{Number of applicable items})} = \text{_____} \%$

## REFERENCES

- Axelsson P. W., Chesney D. A. and Minke J. Powered mobility device skills test. *RESAN*, 2000, pp450-452.
- ✓ Dawson D., Chan R. and Kaiserman E. 1994. "Development of the power-mobility indoor driving assessment for residents of long-term care facilities: a preliminary report." *Canadian Journal of Occupational Therapy*, 61(5), pp269-276.
- Goodwin J., Nguyen-Oghalai T., Kuo Y. and Ottenbacher K. 2007. "Epidemiology of Medicare abuse: the example of wheelchairs" *Journal of the American Geriatrics Society*, 55(2), pp.221-226.
- Letts L., Dawson D. and Kaiserman-Goldstein E. 1998. "Development of power-mobility community driving assessment." *Canadian Journal of Rehabilitation*, 11(3), pp123-129.
- Letts L., Dawson D., Bretholz I., Kaiserman-Goldstein E. 2007. "Gleason J., McLellan E., Norton L. and Roth C. Reliability and validity of the power-mobility community driving assessment." *Assistive Technology*, 19, pp154-163.
- Mills T., Holm M. B., Treffler E., Schmeler M., S. Fitzgerald and M. Boninger 2002 "Development and consumer validation of the functional evaluation in a wheelchair (FEW) instrument." *Disability and Rehabilitation*, 24(1/2/3), pp38-46.
- Mills T., Treffler E., Schmeler M., Fitzgerald S. and Boninger M. 2002. "Development and consumer validation of the functional evaluation in a wheelchair (FEW) instrument." *Disability and Rehabilitation*, 24, pp38-46.
- Massengale S., Folden D., McConnell P., Stratton L. and Whitehead V. 2005. "Effect of visual perception, visual function, cognition, and personality on power wheelchair use in adults." *Assistive Technology*, 17(2), pp.108-121.
- McDonald C. M. 2002. "Physical Activity, Health Impairments, and Disability in Neuromuscular Disease." *American Journal of Physical Medicine & Rehabilitation*, 81(11), pp.108-120.
- Nitz, J. C. 2008. "Evidence from a cohort of able bodied adults to support the need for driver training for motorized scooters before community participation." *Patient Education and Counseling*, 70, pp276-280.
- Routhier F., Vincent C., Desrosier J., Nadeau S. and Guerette C. 2004. "Development of an obstacle course assessment of wheelchair user performance (OCAWUP): a content validity study." *Technology and Disability*, 16, pp19-31.
- Routhier F., Desrosiers J., Vincent C. and Nadeau S. 2005. "Reliability and construct validity studies of an obstacle course assessment of wheelchair user performance." *International Journal of Rehabilitation Research*, 28(1), pp49-56.