

Chapter 25

Remote Wheelchair Selection: Supporting Wheeled Mobility and Seating Device Stakeholder's Decision in Telerehabilitation

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ABSTRACT

Wheeled mobility and seating interventions have been considered one of the most important assistive technology devices in the field of rehabilitation. Telerehabilitation (TR) is an emerging field that has the potential to complement the current in-person assessment to select an appropriate wheeled mobility and seating device in underserved areas. Currently there are limited means for stakeholders to access comprehensive, reliable, monitored, and up-to-date information relative to wheeled mobility and seating devices including performance, coverage criteria, or research evidence as to their benefits and short-comings. The aim of this chapter is to review the current research works related to TR, wheelchair coverage policy issues, and the modern remote wheelchair selection paradigm. As an outcome of the ongoing-research of the authors, the Remote Wheelchair Selection Advisor (RWS-A) system, a knowledge-based decision support system to enhance TR processes, is introduced in this chapter.

INTRODUCTION

Telerehabilitation (TR) is a rehabilitation environment, in which the use of telecommunications technology provides rehabilitation and long-term support to people with disabilities in geographically-

remote regions. Current wheelchair selection and evaluation processes are based on in-person assessment often not available to patients in underserved or rural areas due to lack of expertise by clinicians in wheeled mobility and seating (WMS) interventions. To improve current rehabilitation processes, technologists and clinicians have investigated the use of advanced telecommunications and infor-

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mation technologies as a way of bridging the geographic distance between individuals with specialized medical needs living in remote areas and the source of specialty care (Winters 2002 and Zampolini *et al.* 2008).

The National Institute on Disability and Rehabilitation Research (NIDRR) of U.S. Department of Education funds the Rehabilitation Engineering Research Center on Telerehabilitation (RERC-TR). Since December 2004, the RERC-TR at the University of Pittsburgh (www.rerctr.pitt.edu) serves people with disabilities by researching and developing methods, systems, and technology that support remote delivery of rehabilitation and home health services for people who have limited local access to comprehensive medical rehabilitation outpatient and community-based services. Research and development activities within RERC-TR are in the areas of TR infrastructure and architecture, TR clinical assessment modeling, teleassessment for the promotion of communication function in children with disabilities, remote wheeled mobility assessment, behavioral monitoring and job coaching in vocational rehabilitation, and remote accessibility assessment of the built environment.

WMS interventions have been considered one of the most important assistive technology devices in the field of rehabilitation. The expertise in WMS interventions is a core requirement of the current wheelchair selection and evaluation process. However, this expertise is often not available to patients in rural and/or underserved areas. Today's technology in WMS offers many choices, and makes it challenging to find the most appropriate device. In the last few years, the Centers for Medicare and Medicaid Services (CMS) have focused on ensuring the appropriate prescription of mobility equipment to its beneficiaries. As a result, Medicare issued new coding guidelines and coverage policies for power mobility devices (PMDs). This chapter reviews the current research works related to TR, wheelchair coverage policy issues, and decision support to improve TR prac-

tices. Finally, it introduces Remote Wheelchair Selection Advisor (RWS-A), a decision support system for clinicians, suppliers, and patients with mobility impairments to assist with the selection of an appropriate PMD. This system is from the project, titled "Evaluation of Remote Wheelchair Prescription" of the RERC-TR at the University of Pittsburgh. In conclusion, we discuss lessons learned from a focus group regarding the user acceptance and future direction of research on RWS-A.

BACKGROUND

Current Issues in Wheelchair Selection

Currently, there exists a multitude of WMS devices to meet the needs of people with various types of mobility limitations. These include for example; various types of manual wheelchairs for people with insufficient strength and function to independently propel them; power-operated vehicles (POV) such as scooters and basic power wheelchairs for people with arthritis, cardiopulmonary conditions, or common issues associated with aging; to more complex power wheelchairs with custom seating and control interfaces for people with diagnoses such as spinal cord injury, multiple sclerosis, cerebral palsy, and amyotrophic lateral sclerosis.

Recently, due to multiple instances of fraud and abuse in the provision of WMS interventions to Medicare beneficiaries by untrained suppliers and outdated coverage policies, CMS implemented significant changes to the **Healthcare Common Procedures Coding System (HCPCS)** for WMS. For example, this includes expansion from 4 to 64 unique codes to identify different types of PMDs. The HCPCS is a set of health care procedure codes based on the American Medical Association's Current Procedural Terminology (CPT). The HCPCS was established in 1978 to provide a standardized

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