



Policy analysis on power standing systems

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ABSTRACT

Power wheelchairs provide people with mobility disabilities opportunities for independence in mobility and repositioning themselves. However, current power wheelchair power options covered by Medicare limit the person to a horizontal plane. In the home, access to the vertical plane is also required for mobility related activities of daily living. Power standing systems on power wheelchairs are one option for providing access to the vertical environment, although currently these systems are not covered by Medicare. Power standing systems also aid in medical management and in preventing common comorbidities associated with chronic neurological and congenital healthcare conditions. Therefore, a legal group led an interdisciplinary effort to change Medicare policy on power standing systems. A policy analysis using Bardach's Eightfold policy framework was conducted to analyze a clinical groups' action within this interdisciplinary team. The clinical team considered three viable options to address the problem and evaluated these options against five criteria. Ultimately, a national coverage determination reconsideration would provide a needed opportunity for the coverage of power standing systems. Suggested coverage criteria for power standing systems, based on existing literature and expert clinical experience, are proposed.

1. Introduction

Wheeled mobility devices provide functional mobility and the basis for positioning people who are unable to ambulate safely, in the presence of a temporary or permanent injury, disability, or disease. In the United States, procuring a power wheelchair (PWC) requires navigation of a complex process (Eggers et al., 2009; Greer et al., 2012). Current healthcare policy defines PWCs as durable medical equipment (Centers for Medicare and Medicaid Services, 2003), therefore the process for coverage of wheelchairs and accessories are governed by legislation and the beneficiary's health plan policies. Public healthcare systems, Medicare and Medicaid, often set the precedent for private insurers; therefore, establishing coverage through Medicare would provide an evidence based, systematic template for other insurers to follow.

In the United States, wheelchairs, accessories, and power systems are categorized into coding groups for reimbursement (Stanley, 2015). People with chronic, complex medical conditions such as Multiple Sclerosis and Spinal Cord Injury often need at minimum a Group 2 power wheelchair (PWC) or a more complex device for everyday use (Centers for Medicare and Medicaid Services, 2015a)). These PWCs have

been categorized in policies as complex rehabilitation technology (CRT) (Centers for Medicare and Medicaid Services Department of Health and Human Services, 2018), and are available with power options such as tilt, recline, and elevating legrests that enable the person to independently manage pressure relief and repositioning, among other medical needs (Dicianno et al., 2009; Centers for Medicare and Medicaid Services, 2015a; Centers for Medicare and Medicaid Services, 2015b).

Currently, Medicare will consider payment for the above listed power options when the beneficiary meets the defined coverage criteria (Centers for Medicare and Medicaid Services, 2015a). However, Medicare does not provide coverage for power standing systems on PWCs. Power standing systems move PWC users from a seated position, with horizontal seat position parallel to the floor, into a supported standing position, which can range from less than 50 to 90 degrees (vertical to the floor) with therapeutic benefits (Sprigle et al., 2010). PWCs need specific capabilities to safely operate a power standing system; therefore, they are currently available on select wheelchair bases categorized as Group 3 and 4 PWCs. Power standing systems provide users unique medical benefits, as well as access to the vertical environment, which PWC users cannot achieve using the other power options.

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To address the Medicare lack of coverage of power standing systems, a national multi-disciplinary advocacy organization led by a legal group, with a comprehensive strategy, recruited organizations with clinical, reimbursement and technology, and consumer emphasis (Fig. 1). The Clinician Task Force, a non-profit group of physical and occupational therapists in the United States that advocate for appropriate wheelchair seating and mobility equipment, was consulted to provide a skilled clinical voice (Clinician Task Force, n.d.). The Clinician Task Force, whose work is funded through donations from various suppliers, manufacturers, and other non-profit organizations, is respected in the healthcare environment as a non-biased voice that advocates for access to complex rehabilitation technology. This paper, written by the clinical team members involved in this project, primarily aims to describe the support for the policy change for power standing systems, using a systematic process. Furthermore, this provides an example of a process that may be replicated by other healthcare professionals that strive to impact policy change.

2. Method: Bardach 8-Step policy analysis

This policy analysis will utilize a modified form of Bardach’s 8-step framework for Policy Analysis (Fig. 2) (Bardach and Patashnik, 2020). This analytical method was chosen as it considers key factors of the complex healthcare system. Given the nature of this process, no ethics board approval was pursued.

2.1. Step 1: Define the problem

People with chronic neurological conditions who are non-ambulatory are likely to experience decreased joint mobility (Bushby et al., 2010; Diong et al., 2012), spasticity (Ehrmann et al., 2020), loss of bone mineral density (Eser et al., 2003; Shields et al., 2006; Beaupre and Lew, 2006; Lazoura et al., 2008), kidney and bladder issues (Levi et al., 1995; Yan et al., 2018; Mahoney et al., 2007; Chen et al., 2000; Hansen et al., 2007), digestive conditions (Bouras and Tangelos, 2009; Rao and Go, 2010), and pressure injuries (Flett et al., 2019) while managing their disease. These comorbidities can threaten the person’s health suddenly, and more seriously, than the primary medical diagnosis.

Physical and occupational therapists have historically used standing

as a therapeutic intervention to improve secondary health conditions and comorbidities associated with the disease process (Schofield et al., 2020). However, standing regimens are often not maintained post-discharge due to high equipment cost and limited access (Eng et al., 2001). Even with equipment, standing programs are abandoned due to difficulty managing the equipment, time and energy needed to transfer into and out of the equipment, and the stationary nature of many supported standing devices (Walter et al., 1999). In order to achieve optimal outcomes, standing requires consistency. Utilizing a power standing system within a PWC facilitates independence with standing, as an additional transfer into another system is not necessary. Additionally, movement while standing is possible throughout the environment in a PWC with a power standing system, and multiple sit-to-stand transitions can be completed in one day. This added movement and consistency may aid management of or ameliorate secondary conditions, especially if implemented soon after injury or loss of lower extremity function.

In order to qualify for a power standing system, the person must first meet coverage criteria for a Group 3 PWC. For Medicare payment of a Group 3 PWC, the ambulatory limitation must be due to “...a neurological condition, myopathy, or a congenital skeletal deformity.” (Centers for Medicare and Medicaid Services, 2015a). The subsequent

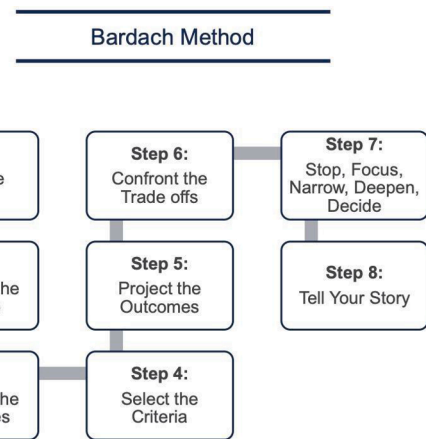


Fig. 2. The Bardach Method.

Group Members and Responsibilities

Led by the ITEM Coalition

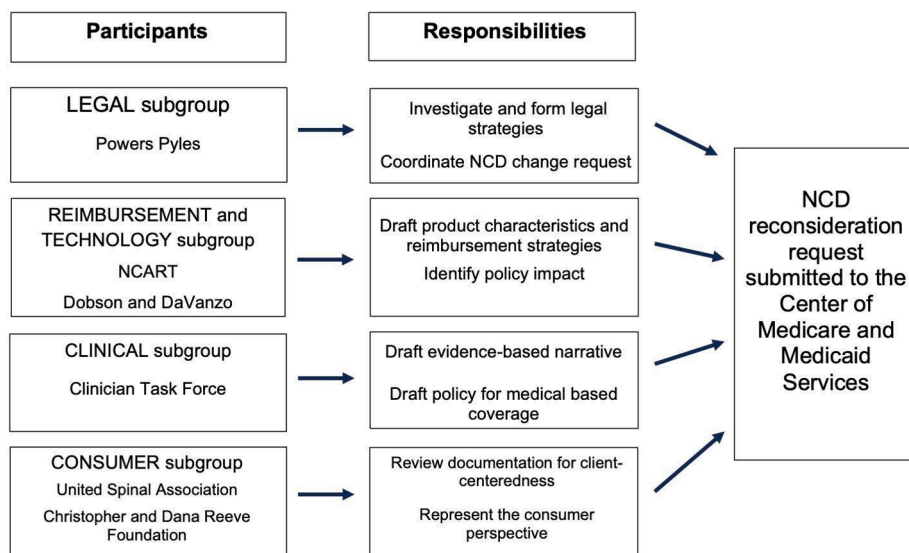


Fig. 1. Reconsideration request team for the National Coverage Determination on Mobility Assistive Equipment.

Medicare policy article defines coverage criteria for power options, but states that power standing systems are "...non-covered because they are not primarily medical in nature" (Centers for Medicare and Medicaid Services, 2015b). For the purpose of this policy reconsideration, a health economics consulting firm utilized a multi-factorial process to estimate that the non-payment of power standing systems impacts approximately 18% of Group 3 PWC users (Dobson DaVanzo, 2020).

2.2. Step 2: Assemble some evidence

The clinical team performed an extensive literature search to form an evidence-based narrative describing the medical basis of power standing systems. Evidence selection was framed using 13.5.3 of the *Medicare Program Integrity Manual* and other CMS documents (Centers for Medicare and Medicaid Services, 2013; Centers for Medicare and Medicaid Services, 2015; Centers for Medicare and Medicaid Services, Medicare Program Integrity Manual, 2019); therefore, the included evidence was published in peer-reviewed medical journals, were evidence-based consensus statements, and/or were clinical guidelines. In each study, the sample, instrumentation, and outcomes were examined for representativeness and reliability to the equipment function considering age (people over and under the age of 65) and diagnoses (e.g. healthy condition, chronic and progressive conditions) of the beneficiary population (U.S. Department of Health and Human Services, 2014). Reviewed research focused on supported standing in a variety of devices, with judicious comparability to power standing systems when necessary. A consensus of expert opinions was utilized to select evidence and, once compiled, the narrative was agreed upon by additional clinical experts in the field (Centers for Medicare and Medicaid Services, 2015). The compiled evidence identified the impact of power standing on five major body systems, which are abbreviated here.

2.2.1. Musculoskeletal system

Limited range of motion impacts daily tasks such as dressing, transfers, and toileting and bathing (Levi et al., 1995). Standing impacts both upper and lower extremity range of motion. Shoulder position while standing demonstrated less anterior scapular tilt and greater glenohumeral external rotation (Riek et al., 2008), which can reduce common symptoms of pain and limited mobility, or impingement of the shoulder. Studies measured lower extremity joint mobility, with high evidence found that supported standing maintains calf muscle and soft tissue length (Newman and Barker, 2012). Standing improved (in variable increments) hip, knee, and ankle joint range of motion in people with chronic neurological conditions (Baker et al., 2007; Ben et al., 2005; Kunkel et al., 1993; Robinson et al., 2008; Townsend et al., 2016), with efficacy potentially related to the person's position in standing, as stretches to the end of available range are more likely to increase muscle length (Newman and Barker, 2012).

The presence of increased muscle tone, or spasticity, often has detrimental results on joint range of motion that may lead to severely restricted joint movement or contractures (Dehail et al., 2019; Kheder and Nair, 2012; Newman and Barker, 2012). Furthermore, spasticity is often related to the development of pressure injuries and/or pain that requires treatment (Kheder and Nair, 2012; Tyry et al., 2013). Standing may reduce resistance to passive ankle movement (Odéen and Knutsson, 1981), and result in decreased Modified Ashworth Scale scores (a measure of muscle tone or spasticity) (Baker et al., 2007; Bohannon, 1993). Spasticity did not appear to be reduced in subjects who stood in a standing frame, although their instrument only graded two levels of increased tone (Kunkel et al., 1993), while the Modified Ashworth Scale defines six (Ashworth, 1964; Bohannon and Smith, 1987); therefore, it may not have been sensitive to change.

Lastly, bone mineral density (BMD) decreases at a quicker rate in non-ambulatory than ambulatory people (Wilmet et al., 1995; Eser et al., 2003; Shields et al., 2006; Beaupre and Lew, 2006; Lazoura et al., 2008), contributing to osteoporosis, changes in bone structure, and fractures

(Beaupre and Lew, 2006; Dudley-Javoroski and Shields, 2008; Vestergaard et al., 1998; Ashe et al., 2006). Frequent and consistent standing may maintain current levels (Frey-Rindova et al., 2000; Paleg and Livingstone, 2015; Townsend et al., 2016) or slow the decline (Aleknina et al., 2008; de Bruin et al., 1999).

2.2.2. Urinary and digestive systems

Supported standing in a power standing system may improve systemic health as well as management of the urinary and digestive systems. Hypercalciuria, related to risk of secondary conditions such as kidney stones (Kaplan et al., 1981), may lower with consistent standing. Furthermore, voiding in a standing position may facilitate relaxation, enable urinary flow, and bladder emptying in males more than sitting (Ozgurbuz and Eser, 2018). Bowel issues, such as constipation, may be lessened by transitioning between sitting and standing (Hoening et al., 2001; Moore et al., 1988) as performing more transitions improves bowel motility. This is possible to perform independently in a power standing system on a PWC, without requiring assistance from others, storage of another device, or pharmaceutical intervention.

2.2.3. Integumentary system

Maintaining skin integrity through pressure management strategies remains a core priority for PWC users, due to the cumulative risk for pressure injuries from immobility, motor and/or sensory impairments (Flett et al., 2019). PWC users often use a combination of tilt, recline, and power elevating leg rests to manage pressure distribution. Standing or using the recline feature distributes pressure across the seat surface at the end range to reduce pressures; however, standing *uniquely* provides pressure relief at the seat and the back simultaneously (Sprigle et al., 2010). Recommendations to frequently change positions for optimal pressure relief are more functional for a person to complete in an upright, standing position compared to lying almost flat on their back in their PWC. Standing also takes up less space, facilitating greater access to the environment while completing daily tasks.

2.2.4. Mobility related activities of daily living

The Centers for Medicare and Medicaid define mobility related activities of daily living (MRADLs) as any activity (e.g. toileting, dressing, bathing, feeding) that requires the individual to move within his/her environment to participate in or complete these tasks (Centers for Medicare and Medicaid Services., 2005a). For the PWC user, many of these environments are above shoulder level and difficult to access safely and efficiently. The ability to stand during these tasks increased efficiency in daily care routines, and required less transfers (Vorster et al., 2019). Power standing systems enable independence within home, school and work environments by facilitating improved access and reduction of potential injury by reducing transfer frequency to a separate supported standing device (Eng et al., 2001; Forslund et al., 2017; Schiappa et al., 2019; Vorster et al., 2019).

PWC users prioritize MRADL performance, as well as maintaining musculoskeletal, urinary and digestive, integumentary, and cardiovascular health. The research supports that power standing systems address primarily medical aspects of PWC users in these areas.

2.3. Step 3: Construct the alternatives

The Medicare classification of power standing systems limits access to power standing systems, although the evidence supports that power standing systems are primarily medical in nature. To increase access, power standing systems must be recognized as primarily medical in nature, and recategorized as durable medical equipment (DME). Various pathways exist that may meet this aim, of which, the three primary options will be explained further: 1) a legislative approach that redefines the overall benefit category for CRT, 2) a regulatory approach addressing the policies impacting power standing systems, and 3) no change to the current system.

To comprehensively meet the needs of people with chronic healthcare conditions, stakeholders have proposed legislation, most recently H.R. 2408 [Ensuring Access to Quality Complex Rehabilitation Technology \(2019\)](#). This bill aims to formally establish a separate benefit category for CRT, apart from DME, which would protect access to power standing systems and all specialized equipment in the CRT category. Some states, such as Wisconsin, have already adopted CRT legislation ([S. B. 605, 2019](#)). In this policy analysis, Alternative 1 indicates that the bill could be adopted as legislation, which would result in changes that may consider power standing systems as covered devices.

However, policy changes for power standing systems can occur without substantial legislative action. Currently, wheelchairs and accessories are regulated through coverage policies for the Healthcare Common Procedure Coding System (HCPCS) code E2301, the healthcare-required code assigned to power standing systems. Policies are published by some states (e.g., [Minnesota Department of Human Services, 2020](#)), and some commercial insurance plans provide coverage, but on an individual basis. Although any funding is better than none, many funding sources follow Medicare’s policies.

Alternative 2 ([Fig. 3](#)) directs the change of Medicare’s policy to include coverage of power standing systems. This would require multiple steps. First, power standing systems must be classified as “primarily medical in nature” ([Centers for Medicare and Medicaid Services, 2015b](#)). A subsequent coverage determination would establish power standing systems as a DME benefit, and initiate the need for policies defining the conditions under which Medicare would provide payment for these systems. The governing national coverage determination (NCD) on Mobility Assistive Equipment would need to acknowledge the role of accessories in supporting MRADL performance, and access to the vertical environment ([Centers for Medicare and Medicaid Services, 2005b](#)). Lastly, the local coverage article (LCA) on Wheelchair Options and Accessories would need to describe the specific criteria under which a beneficiary would be eligible for a power standing system ([Centers for Medicare and Medicaid Services, 2015b](#)).

Alternative 3 requires no change in the current Medicare stance on power standing systems. This would require no legislative or regulatory change; however, it fails to consider how consistent standing could mediate the increased risk of medical complications, such as pressure injuries, contractures, and bladder/bowel concerns that occur with complex medical conditions. If no change, beneficiaries with Medicare as a funding source would either go without a power standing system, pursue alternative funding, or private pay for the power standing system. Pursuing alternative funding is accompanied by increased administrative burden and length of time to receive it. Additionally, limited alternative funding sources exist. Private pay is often out of reach for

wheelchair users with complex medical conditions due to the cost of the systems.

2.4. Step 4: Select the criteria

The optimal outcome for the medical management of chronic, neurological medical diagnoses would include the consistent utilization of a power standing system in their daily routine, when the person can tolerate an upright supported standing position and exhibits potential for loss of range of motion, strength or spasms, urinary or digestive issues. The most important evaluative criteria is the extent to which a proposed outcome will address the problem ([Bardach and Patashnik, 2020](#)). Therefore, a holistic approach was utilized to ensure that the alternatives comprehensively considered both the population and healthcare organization needs.

From a healthcare perspective, the practitioner must primarily consider what contributes to, “...promoting inclusion, participation, safety, and well-being for all recipients of service in various stages of life, health, and illness...” ([AOTA, 2020](#), p. 1). Therefore, our clinical group rated the physical, cognitive, and psychosocial benefits of using a power standing device as the most important criteria to rate alternatives against. Secondly, an examination of the ethical impact of the policy weighed the risk and harm of implementation on the beneficiary who needs CRT. Moral theories from a consequentialist perspective, a common approach used to evaluate healthcare policy changes in the United States, considers what is good for the greater population ([Morrison and Furlong, 2014](#)). However, the population of people needing CRT is significantly smaller and widely different than the greater population, and needs a narrower lens to examine the ethical impact of policy alternatives.

The optimal outcome to improve medical management of chronic medical diagnoses will also impact the Centers for Medicare and Medicaid. Most notably, providing power standing systems for beneficiaries requires economic and administrative resources. The healthcare system is in place to provide medically necessary care; however, pragmatic concerns require consideration of the feasibility and sustainability of including power standing systems as covered equipment, from the healthcare organization’s perspective.

Finally, the perspective of the beneficiary who would use the power standing systems must be considered, as they are the primary users of the systems. Previous research has reported barriers to using non-integrated standing systems consistently, such as assistance needed transferring into and out of the devices and storage and access to additional medical equipment ([Eng et al., 2001; Walter et al., 1999](#)), which are not issues with integrated power standing systems.

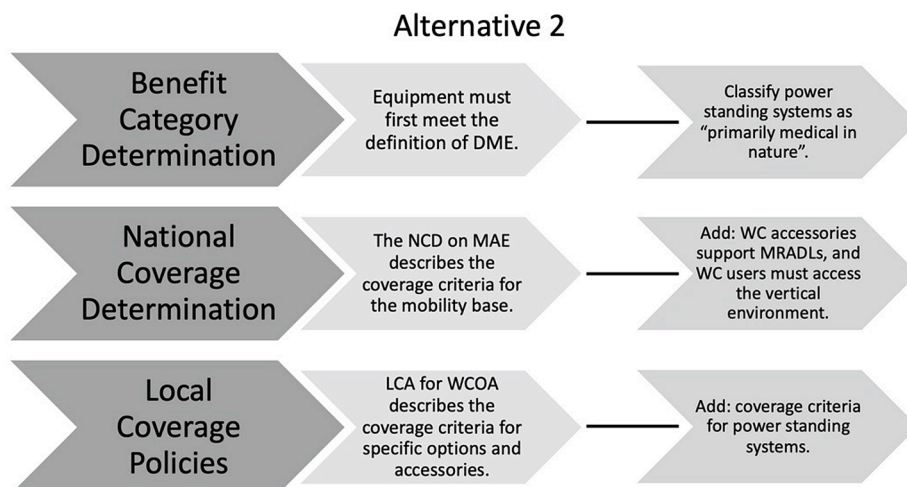


Fig. 3. Alternative pathway 2.

Additionally, involvement from United Spinal Association and the Christopher and Dana Reeves Foundation, consumer advocacy groups, and other support from other advocacy associations such as the ALS Association, exemplified beneficiary need for these systems (ITEM Coalition, 2020b).

2.5. Step 5: Project the outcomes and step 6: Confront the trade-offs

The decision matrix (Table 1) was utilized to examine the outcomes in relationship to the evaluative criteria. Ratings of “low, medium, and high” were utilized to rate the impact of the alternatives on the criteria. When quantitative description is not feasible, due to lack of information, or inability to gather all the information necessary, verbal descriptors may suffice (Bardach and Patashnik, 2020). In this instance, while quantitative information exists for the “no change” and “NCD change” columns; the information for H.R. 2408 does not, to the authors’ knowledge. Therefore, to ensure consistency, verbal descriptors were used above and quantitative information provided below, where appropriate.

The beneficiary related outcomes (population benefit, ethical impact on the population, and beneficiary preferences) held greater weight for two reasons: 1. The impact on the beneficiary is the primary concern of the rehabilitation professional, and 2. The decision made by the Centers for Medicare and Medicaid will impact beneficiaries with funding sources other than Medicare alone, as other funding sources are likely to follow suit. Bardach and Patashnik (2020) describe the first step in projecting the outcomes as identifying a “base case” (p. 52), defined here as “no change to current policy”. This option would change nothing about the current system, and would result in low population benefit, ethical impact, and cost and economic demand. It would continue to restrict a PWC user’s access to the vertical environment. Additionally, the feasibility of equipment coding and claims processing in the current healthcare system has been called into question (Centers for Medicare and Medicaid Services 2020).

Modifying the NCD and categorizing power standing systems as DME would provide an opportunity to establish coverage criteria in the LCD for power standing systems. Adopting this option would increase access to power standing systems, without impacting other CRT equipment. Dobson DaVanzo (2020) estimated that this option will cost the Centers for Medicare and Medicaid approximately \$198 million dollars over a 10-year period; however, this estimate does not account for reduced medical management costs (including hospitalizations) for pressure injuries, fractures, pain, and digestion related conditions that should occur as a result of consistent participation in a standing regimen. In 2007, a 3-day hospital stay to treat constipation cost almost \$3,000 (Singh et al., 2007). Furthermore, people with spinal cord injuries with a pressure injury are hospitalized, on average, 50 days, and spend approximately \$73,000 more in healthcare costs than those without a pressure injury per year (Stroupe et al., 2011). Considering the cost of managing pressure injuries and digestion related issues alone, payment for power

Table 1

Criteria (weight %)	No change to current policy	NCD change	H.R. 2408
Population benefit Weight: 35	Low	Medium	High
Ethical impact on the population Weight: 25	Low	Medium	High
Cost and economic demand Weight: 10	Low	Medium	Medium
Administrative feasibility for claims processing Weight: 10	Medium	Medium	Medium
Beneficiary preferences Weight: 20	No	Yes	Yes

Note. A low, medium, high impact rating evaluated four of the five areas; beneficiary preferences were rated using yes or no, based on individual consumer feedback and consumer group involvement during the NCD reconsideration process.

standing systems may result in a cost-neutral change. The administrative burden of processing claims for power standing systems would assimilate into the current system. This is, likely, the most realistic option, with low trade-offs and greater impact.

Finally, the bill H.R. 2408 could pass into law, resulting in a separate benefit category for CRT (Ensuring Access, 2019). Designing a system to balance medical benefit and ethics with feasibility and cost management for this unique population would result in the most appropriate system. In the end, it is expected that the cost and economic demand, as well as administrative feasibility, would likely be balanced with the current system while providing more person-centered care. This substantial change would require political backing, system design and implementation by the Centers of Medicare and Medicaid, and most of all, extra time.

2.6. Step 7: Stop, Focus, Narrow, Deepen, Decide! and step 8: Tell your story

While the feasibility to administer H.R. 2408 after implementation was projected at a medium demand under typical conditions, the strain that the recent COVID-19 pandemic has placed on the Centers for Medicare and Medicaid lowers the possibility of this option. After evaluating the possibilities, the ITEM coalition organized a strategic program to utilize experts in the service delivery of CRT to collaborate on an NCD change request. The clinical team contributed an evidence-based narrative describing the medical nature of power standing systems, a rationale comparing the medical nature of power standing systems against other covered and non-covered equipment, and proposed coverage criteria, based on the evidence, for the power standing systems. The proposed coverage criteria, intended for incorporation into the LCD on Wheelchair Options and Accessories, aligned with the evidence base and clinical consensus (Fig. 4). These documents were combined with the legal and reimbursement perspectives, distributed to advocacy groups to request support, and the NCD request was submitted to the Centers for Medicare and Medicaid for consideration in October 2020 (ITEM Coalition, 2020a). At the time of this manuscript, the NCD request remains under consideration.

3. Conclusion

Healthcare policies provide criteria for qualifications and act as a fundamental guideline in the procurement of mobility devices. However, technology advancements and research often occur at a faster rate than policy change. An individual with a disability is dependent on their policy coverage and funding criteria to receive a mobility device and accessories that will increase their independence, health and safety. The authors of this analysis feel that current coverage policies on power standing systems, classifying them as a convenience item, are no longer applicable. Extensive research on the medical and functional benefits of standing have been previously published, and there are viable pathways that support payment of power standing systems as a medical necessity. The potential long-term savings of decreasing secondary health conditions and hospitalizations outweigh the initial up-front cost, and therefore power standing systems should be considered medically necessary.

4. Fundings

The authors of this article received no internal or external funding support for this project.

5. Ethical Approvals

No human subjects or data, other than existing peer reviewed research, was utilized for this manuscript. The other organizations and peers involved in the NCD reconsideration request are aware this manuscript is being submitted for publication and have been provided

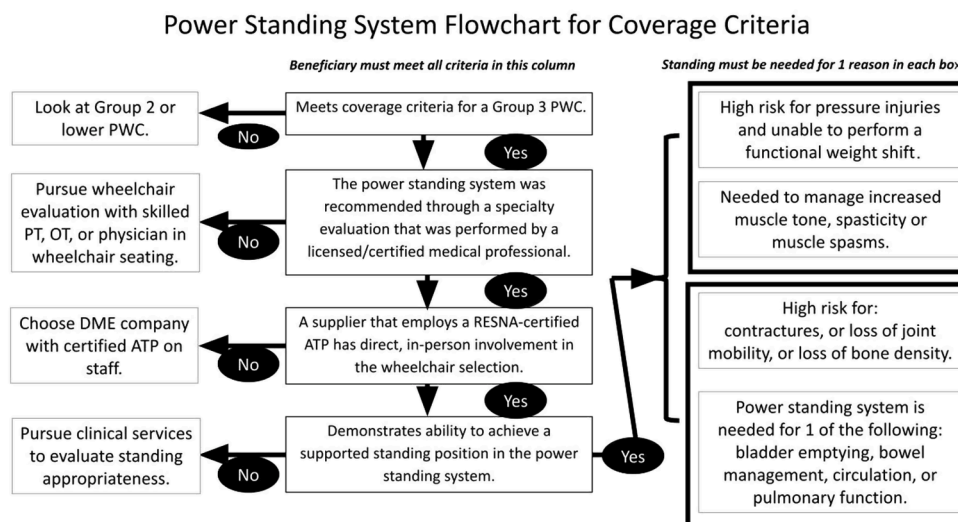


Fig. 4. Proposed coverage criteria for power standing systems. *Note.* Coverage criteria begins at the top of the middle column. Left to right: PT = Physical Therapist; OT = Occupational Therapist; DME = Durable Medical Equipment; PWC = power wheelchair; RESNA = Rehabilitation Engineering and Assistive Technology Association; ATP = Assistive Technology Professional.

the opportunity to review.

6. Previous presentations

The NCD reconsideration request is posted on the ITEM Coalition website at <https://itemcoalition.org>. The content has been modified for the purpose of this paper.

This information was presented in a modified and significantly summarized half hour Buzz Session at the 2021 RESNA conference:

LaBerge, N., Detterbeck, A., & Masselink, C. (July 7, 2021). Why it is time for a policy change on standing power mobility. RESNA 2021 Virtual Conference.

CRedit authorship contribution statement

Cara E. Masselink: Project administration, Methodology, Investigation, Resources, Writing – original draft, Writing - review & editing. **Nicole LaBerge:** Investigation, Visualization, Writing – original draft, Writing - review & editing. **Ashley Detterbeck:** Investigation, Visualization, Writing – original draft, Writing - review & editing.

Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Cara E. Masselink and Nicole LaBerge have no commercial or financial associations that might pose a conflict of interest in connection with this submitted manuscript. Ashley Detterbeck is a Regional Clinical Education Manager for Permobil, a major manufacturer of Standing Power Mobility Devices.

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