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A Diagnosis of Dismobility—Giving Mobility Clinical Visibility:

A Mobility Working Group Recommendation

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Slow gait limits independence, decreases quality of life, and is associated with an increased risk of disability, hospitalization, placement in long-term care,^{1,2} and accelerated clinical progression of many chronic diseases, including chronic obstructive pulmonary disease, diabetes, congestive heart failure, and dementia. Slow gait speed is also a predictor of all-cause mortality.³ Measuring gait speed is simple, quick, reproducible, inexpensive, and feasible in clinical settings. These characteristics have led to the recommendation that gait speed be considered a vital sign for the care of older patients.

Given the predictive power of slow gait speed, it is surprising that it is overlooked in medical practice and virtually never recorded in medical records. Clinicians typically engage older patients who are sitting on examination tables and rarely do they explore or quantify their patients' ability to walk. The lack of a diagnosis for very slow gait speed makes impaired mobility invisible.

Establishing a diagnosis of dismobility, defined as a very slow gait speed of 0.6 m/s or slower, may have several benefits. A diagnosis of poor mobility may improve clinical care, research, and regulatory approval of treatments to improve mobility. Establishing diagnoses based on cut points for measurements, such as blood pressure and bone density, enabled clinical diagnosis, research, and development of treatments for hypertension, osteoporosis, and other conditions. Analogously, a definition of dismobility based on a cut point for slow gait speed might generate similar benefits for diagnosis and treatment of impaired mobility.

Measuring gait speed is simple, quick, reproducible, inexpensive, and feasible in clinical settings.

Patients with dismobility should be evaluated for treatable contributing medical conditions, including disorders of the nervous, sensory, and musculoskeletal and cardio-respiratory

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systems, as well as deconditioning.⁴ Establishing a diagnosis of dismobility will stimulate studies of potentially treatable causes of very slow gait speed, such as low muscle strength or muscle mass, peripheral vascular disease, vitamin D deficiency, and low testosterone levels. When a medical condition, such as heart failure or osteoarthritis, causes very slow gait speed, establishing a secondary diagnosis of dismobility may focus attention on an important consequence of the disease that has prognostic value and might also be improved by better treatment of the primary condition or mobility-specific treatment.

A diagnosis of dismobility should prompt clinicians to take actions to improve or maintain physical performance to reduce the risk of poor outcomes. Patients should be counseled about participating in a program of regular exercise that has been shown to prevent declining gait speed in older adults with impaired mobility.⁵ Physical therapy and rehabilitation programs may also improve mobility in patients with impaired gait. Follow-up measurements of walking speed could be used to monitor the effects of treatments.

Establishing dismobility as a diagnosis could help to facilitate the development of therapies that might prevent or treat the problem. Dismobility could be used as an entry criterion for trials aimed at improving mobility, or as an end point for trials aimed at preserving mobility in people with faster gait speeds. Change in gait speed is a potentially useful end point for trials because it is a precise continuous measurement that could be used in relatively small early-stage trials to test whether new treatments hold promise.

Gait speed measured by a timed 4-m walk at a patient's usual pace has been widely used in clinical and epidemiological research and has high reproducibility.⁶ The diagnosis of dismobility should be standardized and reproducible in clinical practice. Measurements should be made on clearly marked courses, with the patient standing on the starting line. Patients should be told to walk at their usual speed. Timing starts from the first foot movement and ends when 1 foot completely crosses the end line.

Dismobility is distinct from other terms related to poor mobility because it is based on measured gait speed only. The Short Physical Performance Battery (SPPB) includes categories of gait speed but also includes scores for tests of static balance and timed chair rises. Definitions of frailty may include slow gait but also require other assessments such as weight loss and fatigue. In contrast to gait speed, the requirement for several assessments and calculation of scores makes these concepts more complex to apply in busy clinical settings.

As is true for blood pressure and stroke, and bone density and fracture, there is no apparent threshold in the graded associations between walking speed and clinical outcomes related to mobility (Figure). Nevertheless, the 0.6-m/s cut point may be appropriate because as walking speed slows below this point, the risk of disability and other poor health outcomes increases rapidly. A gait speed slower than 0.6 m/s is uncommon in people younger than 65 years, but the prevalence then steadily increases with age (Table). Working groups have proposed using cut point values of 0.8 m/s and 1.0 m/s to define slow gait speed.^{7,8} Based on the National Health and Nutrition Examination Survey, a representative sample of the US

population, at these cut points the prevalence of dismobility at 65 years or younger exceed 5% for 0.8 m/s and 25% for 1.0 m/s (Table).

Therefore, using these faster cut points would assign a diagnosis of dismobility to millions more people. Although people who have gait speeds between 0.6 m/s and 0.8 m/s have an increased risk of poor outcomes that might warrant clinical trials of treatments to prevent dismobility, it is prudent to establish a diagnosis based on a slower cut point of 0.6 m/s and consider expanding the definition if evidence accumulates that people just above this cut point also benefit from clinical evaluation and treatments. Although women have slower gait speeds than men, a single diagnostic cut point would be valuable for simplicity and because the probability of loss of function increases rapidly at 0.6 m/s in both sexes. This cut point is based primarily on data from white populations in the United States. Confirming that the diagnosis also applies more generally requires further research.

The personal and social burden of impaired mobility is increasing rapidly. By 2040, the United States is expected to have more than 81 million adults older than 65 years, and 15.4 million older adults will be expected to be unable to walk 2 to 3 blocks, potentially adding an estimated \$42 billion to annual health care costs.⁹ Making impaired mobility a diagnosis is an important first step toward preventing disability and dependence for millions of elderly and chronically ill patients.

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Appendix

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Figure.

Prevalence of Either Disability for Activities of Daily Living or Mobility Disability by Usual Gait Speed Among Men Aged 80 Years (N=6534)

ADL indicates activities of daily living. Based on data from Guralnik and colleagues.¹⁰

TableGait Speed in Sex and Age Groups in the US Population^a

Age, y	No. of Patients	Prevalence, %			
		<0.6 m/s	<0.8 m/s	<1.0 m/s	
Men					
50–54	189	1.2	6.2	26.0	
55–59	125	0.6	5.6	25.6	
60–64	163	3.1	5.6	27.3	
65–69	136	9.4	15.1	39.2	
70–74	143	5.0	20.7	45.5	
75–79	104	8.2	27.8	62.9	
80–84	102	15.8	47.5	75.1	
85	53	31.0	60.0	88.0	
Women					
50–54	169	0.4	4.3	24.9	
55–59	116	1.7	7.1	28.0	
60–64	183	2.7	17.0	41.6	
65–69	143	6.1	24.9	45.7	
70–74	132	14.8	32.9	65.7	
75–79	95	19.6	34.1	63.8	
80–84	108	22.8	62.9	84.8	
85	66	52.0	78.2	93.9	

^aAnalysis of National Health and Nutrition Examination Survey data by Peggy Cawthon, MPH, PhD (California Pacific Medical Center Research Institute).