This article is the second in a series of four devoted to standardized testing that may be used in the home care setting for community-dwelling older adults. Relying on evidence-based practice, a physical therapist’s evaluative skills will continue to evolve over time and allow for more effective assessment, treatment intervention, and ensure improved quality outcomes. The 30 second chair stand test described previously is a test measuring lower extremity strength. This article will describe the 2 minute step test (2MST) which objectively measures aerobic capacity/endurance and has age/gender matched normative data for comparison of adults 60-94 years of age.

Many practicing therapists currently define endurance as poor, fair or good based on observation of fatigue, dyspnea, and shortness of breath exhibited during physical activity or at rest. However, APTA’s Guide to Physical Therapist Practice recommends using standardized exercise test protocols (eg, ergometry, step tests, time/distance walk/run tests, treadmill test, wheelchair tests) when assessing endurance/aerobic capacity. Should therapists push towards using more objective, quantitative standardized tests rather than descriptive, qualitative assessment tools alone? Absolutely. With the roll out of Recovery Audit Contractors (RAC) nationwide, the Centers for Medicare and Medicaid Services (CMS) is looking to recover potential overpayments for services provided. Strunk reported that RAC companies are focused on areas of potential over and underpayments; asking if submitted documentation supports the claim; were services that were not reasonable and necessary paid for? Strunk recommends that therapists prepare for RAC audits by implementing stronger documentation and coding principles. With the roll out of Recovery Audit Contractors (RAC) nationwide, the Centers for Medicare and Medicaid Services (CMS) is looking to recover potential overpayments for services provided. Strunk reported that RAC companies are focused on areas of potential over and underpayments; asking if submitted documentation supports the claim; were services that were not reasonable and necessary paid for? Strunk recommends that therapists prepare for RAC audits by implementing stronger documentation and coding principles.

The 2MST was developed as an alternative to the 6 minute walk test (6MWT) by Rikli and Jones for instances when space limitations or weather prohibits taking the 6 minute walk test. The 2MST may be considered a misnomer by some because the test does not use a step stool or stairs, but rather is a test of stepping in place (marching in place). Also, do not mistake the 2 minute step test with the 2 minute walk test (2MWT). The 2MWT is based on the 6MWT, but for two minutes, not 6 minutes. LaPier reported that both the 2MWT and 6MWT are valid and reliable tests which are widely used for measurement of endurance and aerobic capacity and have been studied in varied populations and treatment environments, but require “an established, standardized pathway.” These tests are difficult to administer in the home environment, where space limitations challenge the clinician to find enough room suitable for the required pathway. Rikli et al describe the track layout for the 6MWT as needing a 50 yard rectangular area (20 yards by 5 yards), which is very difficult to find in a home care setting.

Rikli and Jones have reported normative scores (n=7183) on the 2MST for men and women from 60 to 94 years of age, broken down into five-year age groups. As would be expected, the results show a declining aerobic capacity/endurance for both men and women with aging. Significant differences between men and women were not observed. See Table 1 for the normative scores.

The 2MST is an easy test to administer in the home environment. See Table 2 for the protocol and procedures for test administration.

The 2MST has been validated to several other measurement tools of aerobic capacity/endurance. Ricki and Jones reported criterion validity correlation for the 2MST to both the 1 mile walk time and to treadmill ambulation at 85% max heart rate. Both test demonstrated a moderate correlation (1 mile walk \( r=.73 \) and treadmill \( r=.74 \)). However, significant differences were noted \( p=.0001 \) between groups (60’s, 70’s and 80’s) and \( p=.0001 \) between exercisers and nonexercisers. Using Intra Class Correlation Coefficient (ICC) values \( r=.90 \) at the 95% confidence interval, revealing that good reliability was established. Miotto et al reported a high ICC \( r=.95 \) for test-retest reliability of the 2MST across three sessions at an acceptable ICC \( r=.83 \) for a single session. Miotto et al reported that there was a significant main effect for group
at the p<.001. The physically active group completed significantly more steps in the 2 minute time period (121.38 ± 20.45) than the sedentary group did (98.46 ± 21.38).11 In the construct validity analysis, the 2MST proved discriminatory between active and sedentary groups.11

The 2MST is easily administered in the home environment, requiring minimal expense for equipment and minimal time for administration. In addition, the 2MST may be used as a treatment intervention and as a motivational tool to demonstrate progress to the patient.

References

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Table 1: Normal Range of Scores for Two Minute Step Test*

<table>
<thead>
<tr>
<th></th>
<th>60-64</th>
<th>65-69</th>
<th>70-74</th>
<th>75-79</th>
<th>80-84</th>
<th>85-89</th>
<th>90-94</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Min. step (no. of steps) Men</td>
<td>87-115</td>
<td>86-116</td>
<td>80-110</td>
<td>73-109</td>
<td>71-103</td>
<td>59-91</td>
<td>52-86</td>
</tr>
<tr>
<td>2-Min. step (no. of steps) Women</td>
<td>75-107</td>
<td>73-107</td>
<td>68-101</td>
<td>68-100</td>
<td>60-91</td>
<td>55-85</td>
<td>44-72</td>
</tr>
</tbody>
</table>

* Normal defined as the middle 50% of the population.6,10

Table 2: Two Minute Step Test

<table>
<thead>
<tr>
<th>Two Minute Step Test</th>
<th>Equipment needed:</th>
<th>Start Position:</th>
<th>Procedure:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stop watch</td>
<td>Subject should be in a standing position near wall, doorway, next to a high back chair or countertop</td>
<td>Demonstration of stepping (not running) in place to the subject</td>
</tr>
<tr>
<td></td>
<td>Tally Counter</td>
<td>Arms at side</td>
<td>Subject will perform 1 to 3 repetitions and is checked for proper form</td>
</tr>
<tr>
<td></td>
<td>Piece of string or cord about 30 in. (76.2 cm) long</td>
<td>Back Straight</td>
<td>Subject is encouraged to complete as many steps as possible within 2 minutes</td>
</tr>
<tr>
<td></td>
<td>Masking Tape</td>
<td>Feet flat on floor</td>
<td>On the signal, “go” the subject steps in place raising legs alternately to the correct height starting with the right leg</td>
</tr>
</tbody>
</table>

Scoring: The score is the total number of correct height steps taken by the right leg within 2 minutes. If a subject needs to stop or slow down during the 2 minute trial, the clock continues to run.2,3,6