

# NIH Toolbox



## Technical Manual

Michael Kallen, PhD, Jerry Slotkin, PhD, James Griffith, PhD, Susan Magasi, PhD, John Salsman, PhD, Cindy Nowinski, MD, PhD, and Richard Gershon, PhD

September 27, 2012

# **NIH Toolbox Technical Manual**

**Domain:**

**MOTOR**

**Subdomain:**

**ENDURANCE**

**Measure:**

**NIH Toolbox 2-Minute Walk Endurance Test**

## Expert Contributors-MOTOR

Dallas Anderson, PhD (National Institute on Aging, NIH), Richard Bohannon, EdD, DPT (University of Connecticut), Deborah Bubela, PhD (University of Connecticut), Diane Damiano, PhD (NIH Clinical Center, NIH), Marjorie Garvey, MD (National Institute of Mental Health, NIH), Jin-Shei Lai, PhD (Northwestern University), Susan Magasi, PhD (Northwestern University), Heather McCreath, PhD (University of California-Los Angeles), David Reuben, MD (University of California-Los Angeles), Rose Marie Rine, PhD (Marshall University), W. Zev Rymer, MD, PhD (Rehabilitation Institute of Chicago)

# Member Institutes, Centers, and Offices

National Center for Complementary and Alternative Medicine (NCCAM)

National Eye Institute (NEI)

National Institute of Biomedical Imaging and Bioengineering (NIBIB)

Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD)

National Institute of Dental and Craniofacial Research (NIDCR)

National Institute of Environmental Health Sciences (NIEHS)

National Institute of General Medical Sciences (NIGMS)

National Institute of Mental Health (NIMH)

National Institute of Neurological Disorders and Stroke (NINDS)

National Institute of Nursing Research (NINR)

National Institute on Aging (NIA)

National Institute on Alcohol Abuse and Alcoholism (NIAAA)

National Institute on Deafness and Other Communication Disorders (NIDCD)

National Institute on Drug Abuse (NIDA)

Office of Behavioral and Social Sciences Research (OBSSR)

This project is funded in whole or in part with Federal funds from the Blueprint for Neuroscience Research and the Office of Behavioral and Social Sciences Research, National Institutes of Health, under Contract No. HHS-N-260-2006-00007-C, with additional support from the National Children's Study, under Contract No. HHS-N-267-2007-00027-C.

This Technical Manual contains the following informational sections:

**Section 1: Introduction to NIH Toolbox**

**Section 2: Validation**

**Section 3: Norming**

**Section 4: NIH Toolbox and the National Children's  
Study (NCS)**

**Section 5: Domain Definition**

**Section 6: Subdomain Definition**

**Section 7: Measure Description**

**Section 8: Post-Validation/Post-Norming Changes to  
the Measure**

**Section 9: The Measure's Scoring Model**

**Section 10: Measure Norms**

## **Section 1: Introduction to NIH Toolbox**

NIH Toolbox is a multidimensional set of brief measures assessing cognitive, emotional, motor, and sensory function from ages 3-85. This suite of on-line and royalty-free measures can be administered to study participants 3 to 85 years of age in two hours or less, across diverse study designs and settings.

### **What is the NIH Toolbox?**

The NIH Toolbox provides a standard set of royalty-free, brief, and comprehensive assessment tools that can be used by researchers and clinicians in a variety of settings, with a particular emphasis on measuring outcomes in longitudinal epidemiologic studies and prevention or intervention trials across the lifespan (ages 3-85). The battery ensures that assessment methods and results can be used for comparisons across existing and future studies and provides a “common currency” for the study of neurological research that promotes economies of scale and enhanced efficiency in measurement. The NIH Toolbox can be used to monitor neurological and behavioral function over time and measure key constructs across developmental stages. This facilitates the study of functional changes across the lifespan, including evaluating intervention and treatment effectiveness.

## **The NIH Toolbox Batteries**

The basic NIH Toolbox can be administered within two hours and divides tests into four domain batteries: Cognition, Emotion, Motor, and Sensation. In addition, within some domains, there are supplemental measures that are available to be administered.

## **Selection of the NIH Toolbox Domains and Subdomains**

Four domains were selected for the NIH Toolbox: Cognition, Emotion, Motor, and Sensation. Subdomain selection was based upon literature reviews, expert interviews, and multiple formal Requests for Information (RFI) of NIH-funded researchers. Initial literature and database reviews and an RFI identified the subdomains for inclusion in the NIH Toolbox, existing measures relevant to the project goals, and criteria for instrument selection. NIH Project Team members, external content experts, and contract scientists met at a follow-up consensus meeting to discuss potential subdomains along with the criteria affecting instrument selection, creation, and norming. Additional expert interviews were undertaken to gather more detailed information from clinical and scientific experts to help further refine the list of possible subdomains. A second consensus group meeting was held and results directed the decision for the final NIH Toolbox to assess four core domain areas (cognitive, emotional, motor, and sensory health and function).

## **Selection of Measures for the NIH Toolbox**

More than 1,400 existing measures were identified and evaluated for potential inclusion in the NIH Toolbox. The selection criteria included a measure's applicability across the life span,



psychometric soundness, brevity, ease of use, applicability in diverse settings and with different groups, and lack of intellectual property constraints. There was also a preference for instruments that were already validated and normed for use with individuals between 3 and 85 years old. Results of the instrument selection process yielded draft development plans established for the NIH Toolbox measures.

### **Early Childhood Use**

NIH Toolbox measure development focused special attention on assessing young children, to ensure that all tests given are developmentally appropriate for ages 3-7. A special team of early childhood assessment consultants was engaged to provide testing guidelines for the very young, to offer input on measure development, and to review all NIH Toolbox measures to ensure they fit the needs of young children. Advanced statistical methods were used to emphasize continuity of measurement, allowing Toolbox users to confidently conduct longitudinal measurement from age 3 through the life span while assessing the same domain constructs.

## **Section 2: Validation**

Validation studies were conducted for all NIH Toolbox Motor domain measures, to assure that these important tools for research met rigorous psychometric standards. Studies were

conducted across the entire age range and were statistically compared against “gold standard” measures wherever available.

For specifics regarding Motor domain measure validation, see: Reuben et al., Motor Assessment Using the NIH Toolbox, *Neurology*, in press; Rine et al., Vestibular Function Assessment Using the NIH Toolbox, *Neurology*, in press. These manuscripts describe measure development studies undertaken (e.g., expert panels for content development and validation; cognitive interviews; small and large-scale pilot testing) and psychometric characteristics (e.g., internal consistency and test-retest reliability; convergent and divergent validity).

### **Section 3: Norming**

NIH Toolbox conducted a large national standardization study in both English and Spanish languages to allow for normative comparisons on each assessment. A sample of 4,859 participants, ages 3-85 – representative of the U.S. population based on gender, ethnicity, race, and socioeconomic status – was administered all of the NIH Toolbox measures at sites around the country (n = 2,917 English-speaking children, ages 3-17; n = 496 Spanish-speaking children, ages 3-7; n = 1,038 English-speaking adults, ages 18-85; n = 408 Spanish-speaking adults, ages 18-85). NIH Toolbox normative scores are now available for each year of age from 3 through 17, as well as for age ranges 18-29, 30-39, 40-49, 50-59, 60-69, and 70-85, allowing for targeted and accurate comparisons to the U.S. population.

Specifics regarding NIH Toolbox norming sampling methods (e.g., stratification by age, gender, and language preference; sampling a minimum of 25-100 individuals per targeted demographic and language subgroup) and norming analytic methods (e.g., post-stratification adjustment using iterative proportional fitting, i.e., “raking”) can be found in the following publication: Beaumont et al., Norming Plans for the NIH Toolbox, *Neurology*, in press.

## **Section 4: NIH Toolbox and the National Children’s Study (NCS)**

In collaboration with NIH Toolbox scientists, NCS investigators selected measures from PROMIS and NIH Toolbox for a Maternal Health Profile, the Maternal Self-Reported Health Battery. This profile assesses Physical Health (Physical function, Fatigue, Sleep disturbance, Sleep-related impairment), Mental Health (Anger, Anxiety, Depression, Positive affect, Perceived stress, Self-efficacy), and Social Health (Social support and companionship, Social isolation). The Maternal Self-Reported Health Battery was field tested in fall 2011, using an online sample of 1000 women (200 pre-conception, 150 pregnant women (50 per trimester), and 650 mothers with a child between 0-36 months of age). In addition, NIH Toolbox norming was jointly sponsored by the NCS and included: 3,413 children in single-year age bands (from 3-17 years); 1,446 adults in seven age bands, including the mothers of children also being tested; and 105 pregnant women. The NIH Toolbox sampling plan matched distributions of race/ethnicity and level of education for each age band.

## Section 5: Domain Definition

**Domain: MOTOR**

Motor function involves complex physiological processes and requires the integration of multiple systems, including neuromuscular, musculoskeletal, cardiopulmonary, and neural motor and sensory-perceptual systems. Motor functional status is indicative of current physical health status, burden of disease, and long-term health outcomes, and is integrally related to daily functioning and quality of life. Given its importance to overall neurological health and function, motor function was identified as a key domain for inclusion in the NIH Toolbox. The Motor domain includes measures of:

### **DEXTERITY**

Measured by:

NIH Toolbox 9-Hole Pegboard Dexterity Test

### **STRENGTH**

Measured by:

NIH Toolbox Grip Strength Test

### **BALANCE**

Measured by:

NIH Toolbox Standing Balance Test

## **LOCOMOTION**

Measured by:

NIH Toolbox 4-Meter Walk Gait Speed Test

## **ENDURANCE**

Measured by:

NIH Toolbox 2-Minute Walk Endurance Test

## **MOTOR Batteries**

The NIH Toolbox Motor Battery for ages 7-85 includes all five core measures described above.

For ages 3-6, the NIH Toolbox Early Childhood Motor Battery includes four core tests, while excluding the 4-Meter Walk Gait Speed Test. There are individual scores provided for each measure, as described below, but there are no composite scores provided for the Motor Battery.

## **Section 6: Subdomain Definition**

### **Subdomain: ENDURANCE**

Endurance refers to the ability to sustain effort that requires conjoint work capacities from cardiopulmonary, biomechanical, and neuromuscular functions in the context of overall fitness.

In NIH Toolbox, Endurance is measured by:

NIH Toolbox 2-Minute Walk Endurance Test

## **Section 7: Measure Description**

### **MOTOR Core Measure**

The NIH Toolbox 2-Minute Walk Endurance Test is adapted from the American Thoracic Society's 6-Minute Walk Test Protocol. This test measures sub-maximal cardiovascular endurance by recording the distance that the participant is able to walk on a 50-foot (out and back) course in two minutes. The participant's raw score is the distance in feet and inches walked in two minutes. The test overall takes approximately four minutes to administer (with instructions and practice). This test is recommended for ages 3-85.

## **Section 8: Post-Validation/Post-Norming Changes to the Measure**

No notable Post-Validation/Post-Norming changes were made to this measure subsequent to those changes previously reported on during the measure's development and validation phases (Reuben et al., Motor Assessment Using the NIH Toolbox, *Neurology*, in press).

## **Section 9: The Measure's Scoring Model**

Measurement theory applied for scoring:

Classical Test Theory (CTT)

CTT scoring approach employed:

Count (the distance (in feet) walked in two minutes)

Measure length:

Timed (two minutes)

Response data:

Continuous

Scores computed/available\*:

Raw Score

Age-Adjusted Scale Score (mean=100, standard deviation=15)

Fully Adjusted Scale Score (mean=100, standard deviation=15)

Unadjusted Scale Score (mean=100, standard deviation=15)

National Percentile Rank (corresponds to the Age-Adjusted Scale Score)

\*Details on these scores and their interpretations are available in the NIH Toolbox Scoring and Interpretation Guide.



## Section 10: Measure Norms

The following Tables and Figure present NIH Toolbox normative data associated with this measure:

**Table 1. Measure Raw/Computed Score, Unadjusted Scale Score, and Fully Adjusted Scale Score Summary (N, Mean, Standard Deviation) by Age Group (3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18-29, 30-39, 40-49, 50-59, 60-69, 70-85, All)**

**Table 2. Measure Raw/Computed Score Statistics (N, Mean, Standard Deviation, Minimum/Maximum Observed, 25<sup>th</sup>/50<sup>th</sup>/75<sup>th</sup> Percentile) per Age Group (3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18-29, 30-39, 40-49, 50-59, 60-69, 70-85, All)**

**Figure 1. Measure Mean Unadjusted Scale Scores across All Age Groups (3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18-29, 30-39, 40-49, 50-59, 60-69, 70-85)**

Table 1. NIH Toolbox 2-minute Walk Endurance Test by Age Group	2-minute Walk Endurance Test (feet)			Endurance Unadjusted Scale Score			Endurance Fully Adjusted Scale Score		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
<b>Age Group</b>									
<b>3</b>	180	415.65	51.11	180	77.14	5.53	163	99.31	8.87
<b>4</b>	222	462.63	45.24	222	82.37	5.24	206	99.55	8.29
<b>5</b>	214	510.67	45.31	214	87.97	5.45	191	99.72	8.75
<b>6</b>	211	579.18	40.51	211	96.64	5.36	189	99.28	7.15
<b>7</b>	251	607.96	44.55	251	100.56	6.04	226	99.37	8.05
<b>8</b>	209	630.64	50.37	209	103.73	6.91	200	99.14	8.47
<b>9</b>	213	652.41	46.78	213	106.88	6.53	202	99.42	8.53
<b>10</b>	235	651.54	51.83	235	106.69	6.91	217	99.42	8.39
<b>11</b>	217	664.70	47.09	217	108.56	6.63	205	99.49	8.30
<b>12</b>	216	662.72	51.57	216	108.37	7.23	206	99.36	8.49
<b>13</b>	220	659.92	52.69	220	107.75	7.27	213	99.28	8.96
<b>14</b>	232	658.61	50.21	232	107.72	7.03	224	99.38	8.06
<b>15</b>	213	657.48	52.94	213	107.50	7.32	207	99.43	8.47
<b>16</b>	212	671.99	54.67	212	109.53	7.66	202	99.27	9.23
<b>17</b>	220	661.97	58.42	220	108.24	8.00	212	99.57	9.16
<b>18 - 29</b>	260	648.28	179.86	260	106.27	24.86	252	98.94	26.32
<b>30 - 39</b>	298	628.80	146.25	298	103.61	19.95	285	99.29	22.77
<b>40 - 49</b>	244	630.88	157.73	244	103.93	21.70	230	99.18	25.13
<b>50 - 59</b>	178	610.83	162.96	178	101.03	22.09	163	99.13	26.77
<b>60 - 69</b>	143	568.49	193.38	143	95.67	24.95	134	99.39	30.15
<b>70 - 85</b>	197	497.24	128.14	197	86.67	15.52	178	99.32	19.78
<b>All</b>	4585	612.22	108.68	4585	101.49	14.49	4305	99.22	15.18

Table 2. NIH Toolbox 2-minute Walk Endurance Test (feet) – Age 3		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	46	38	84	49	47	96	95	85	180
	Mean	403.03	432.70	414.31	439.30	386.04	419.38	412.72	420.47	415.65
	Standard Deviation	67.08	61.28	64.90	38.70	28.13	35.21	54.87	46.79	51.11
	Minimum Observed	100.00	150.00	100.00	150.00	50.00	50.00	100.00	50.00	50.00
	25th Percentile	375.33	385.17	375.33	400.00	350.00	362.00	378.42	361.17	375.33
	50th Percentile (Median)	400.00	412.58	400.00	441.67	400.00	420.33	400.00	411.50	410.00
	75th Percentile	450.00	499.08	468.08	500.00	438.17	480.00	466.83	491.25	470.00
	Maximum Observed	570.50	650.83	650.83	662.08	520.00	662.08	662.08	650.83	662.08

Table 2. NIH Toolbox 2-minute Walk Endurance Test (feet) – Age 4		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	55	65	120	48	54	102	103	119	222
	Mean	451.91	483.76	465.52	458.09	439.19	450.01	453.06	475.46	462.63
	Standard Deviation	63.82	49.16	57.03	28.62	21.05	24.97	50.35	39.71	45.24
	Minimum Observed	300.00	200.00	200.00	250.00	280.00	250.00	250.00	200.00	200.00
	25th Percentile	389.00	432.17	411.33	420.83	394.00	404.83	400.00	424.58	411.33
	50th Percentile (Median)	470.00	473.33	473.25	456.13	432.58	446.25	470.00	473.08	470.00
	75th Percentile	505.25	534.75	513.58	500.00	491.25	493.50	501.33	522.92	511.33
	Maximum Observed	650.00	710.00	710.00	650.00	575.83	650.00	650.00	710.00	710.00

Table 2. NIH Toolbox 2-minute Walk Endurance Test (feet) – Age 5		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	63	60	123	43	48	91	106	108	214
	Mean	504.79	522.51	511.57	506.71	506.27	506.52	505.11	519.37	510.67
	Standard Deviation	60.37	50.16	55.69	28.46	22.90	25.53	49.76	40.34	45.31
	Minimum Observed	290.00	300.00	290.00	361.33	366.17	361.33	290.00	300.00	290.00
	25th Percentile	460.00	480.67	467.08	461.92	471.67	470.00	460.00	474.00	467.08
	50th Percentile (Median)	511.25	530.08	514.50	498.33	523.50	511.42	511.25	528.75	513.42
	75th Percentile	567.67	568.67	568.67	548.08	550.00	550.00	566.17	567.00	567.00
	Maximum Observed	689.42	750.50	750.50	653.33	646.42	653.33	689.42	750.50	750.50

Table 2. NIH Toolbox 2-minute Walk Endurance Test (feet) – Age 6		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	58	61	119	41	51	92	99	112	211
	Mean	585.04	583.65	584.47	550.40	563.63	556.27	578.87	579.61	579.18
	Standard Deviation	52.42	46.69	49.36	26.23	20.55	23.24	44.14	37.20	40.51
	Minimum Observed	413.00	350.00	350.00	400.00	426.75	400.00	400.00	350.00	350.00
	25th Percentile	534.58	549.17	538.50	515.33	527.08	516.08	527.00	534.33	532.33
	50th Percentile (Median)	590.67	598.08	593.08	550.00	557.83	551.83	580.00	591.17	583.67
	75th Percentile	630.00	627.33	628.25	588.08	600.00	600.00	628.08	622.92	623.67
	Maximum Observed	800.00	752.42	800.00	751.17	754.00	754.00	800.00	754.00	800.00

Table 2. NIH Toolbox 2-minute Walk Endurance Test (feet) – Age 7		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	81	78	159	46	46	92	127	124	251
	Mean	611.69	609.15	610.73	592.40	591.69	592.12	608.89	606.44	607.96
	Standard Deviation	60.39	39.61	51.11	35.35	23.29	29.77	52.70	34.48	44.55
	Minimum Observed	393.00	357.75	357.75	422.50	367.33	367.33	393.00	357.75	357.75
	25th Percentile	547.42	567.00	552.25	523.00	550.00	531.33	540.75	566.25	550.00
	50th Percentile (Median)	600.00	612.92	600.33	597.58	600.00	600.00	600.00	610.00	600.00
	75th Percentile	659.17	650.00	650.83	656.33	627.92	650.00	659.17	650.00	650.00
	Maximum Observed	913.00	772.42	913.00	800.00	782.83	800.00	913.00	782.83	913.00

Table 2. NIH Toolbox 2-minute Walk Endurance Test (feet) – Age 8		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	107	102	209	0	0	0	107	102	209
	Mean	637.10	621.12	630.64				637.10	621.12	630.64
	Standard Deviation	54.29	45.73	50.37				54.29	45.73	50.37
	Minimum Observed	403.17	307.17	307.17				403.17	307.17	307.17
	25th Percentile	580.00	575.25	578.17				580.00	575.25	578.17
	50th Percentile (Median)	632.33	610.75	620.00				632.33	610.75	620.00
	75th Percentile	684.00	695.17	685.08				684.00	695.17	685.08
	Maximum Observed	928.25	833.17	928.25				928.25	833.17	928.25

Table 2. NIH Toolbox 2-minute Walk Endurance Test (feet) – Age 9		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	107	106	213	0	0	0	107	106	213
	Mean	645.09	663.67	652.41				645.09	663.67	652.41
	Standard Deviation	53.34	38.66	46.78				53.34	38.66	46.78
	Minimum Observed	400.00	433.00	400.00				400.00	433.00	400.00
	25th Percentile	588.25	611.83	600.00				588.25	611.83	600.00
	50th Percentile (Median)	652.25	673.83	659.25				652.25	673.83	659.25
	75th Percentile	714.67	711.00	714.33				714.67	711.00	714.33
	Maximum Observed	836.17	900.00	900.00				836.17	900.00	900.00

Table 2. NIH Toolbox 2-minute Walk Endurance Test (feet) – Age 10		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	118	117	235	0	0	0	118	117	235
	Mean	656.31	644.07	651.54				656.31	644.07	651.54
	Standard Deviation	62.82	37.65	51.83				62.82	37.65	51.83
	Minimum Observed	221.08	403.67	221.08				221.08	403.67	221.08
	25th Percentile	606.67	592.33	600.00				606.67	592.33	600.00
	50th Percentile (Median)	670.08	644.08	660.00				670.08	644.08	660.00
	75th Percentile	712.25	700.00	703.58				712.25	700.00	703.58
	Maximum Observed	1085.42	827.92	1085.42				1085.42	827.92	1085.42

Table 2. NIH Toolbox 2-minute Walk Endurance Test (feet) – Age 11		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	109	108	217	0	0	0	109	108	217
	Mean	669.67	657.43	664.70				669.67	657.43	664.70
	Standard Deviation	52.42	40.99	47.09				52.42	40.99	47.09
	Minimum Observed	450.58	440.00	440.00				450.58	440.00	440.00
	25th Percentile	604.00	602.33	604.00				604.00	602.33	604.00
	50th Percentile (Median)	671.00	661.50	663.50				671.00	661.50	663.50
	75th Percentile	723.92	710.00	719.50				723.92	710.00	719.50
	Maximum Observed	1000.00	852.83	1000.00				1000.00	852.83	1000.00

Table 2. NIH Toolbox 2-minute Walk Endurance Test (feet) – Age 12		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	101	115	216	0	0	0	101	115	216
	Mean	669.84	653.34	662.72				669.84	653.34	662.72
	Standard Deviation	60.05	42.58	51.57				60.05	42.58	51.57
	Minimum Observed	432.33	450.00	432.33				432.33	450.00	432.33
	25th Percentile	600.83	600.00	600.83				600.83	600.00	600.83
	50th Percentile (Median)	676.83	651.50	670.00				676.83	651.50	670.00
	75th Percentile	741.08	710.58	726.25				741.08	710.58	726.25
	Maximum Observed	908.25	832.50	908.25				908.25	832.50	908.25

Table 2. NIH Toolbox 2-minute Walk Endurance Test (feet) – Age 13		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	118	102	220	0	0	0	118	102	220
	Mean	666.27	647.92	659.92				666.27	647.92	659.92
	Standard Deviation	60.27	41.99	52.69				60.27	41.99	52.69
	Minimum Observed	439.08	300.83	300.83				439.08	300.83	300.83
	25th Percentile	600.00	592.67	596.58				600.00	592.67	596.58
	50th Percentile (Median)	655.67	644.25	650.00				655.67	644.25	650.00
	75th Percentile	725.17	700.00	718.00				725.17	700.00	718.00
	Maximum Observed	950.00	894.92	950.00				950.00	894.92	950.00

Table 2. NIH Toolbox 2-minute Walk Endurance Test (feet) – Age 14		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	113	119	232	0	0	0	113	119	232
	Mean	673.83	636.37	658.61				673.83	636.37	658.61
	Standard Deviation	59.15	37.67	50.21				59.15	37.67	50.21
	Minimum Observed	429.42	428.67	428.67				429.42	428.67	428.67
	25th Percentile	612.50	580.67	593.50				612.50	580.67	593.50
	50th Percentile (Median)	668.33	640.00	656.08				668.33	640.00	656.08
	75th Percentile	740.00	690.00	714.50				740.00	690.00	714.50
	Maximum Observed	999.83	801.75	999.83				999.83	801.75	999.83



Table 2. NIH Toolbox 2-minute Walk Endurance Test (feet) – Age 15		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	104	109	213	0	0	0	104	109	213
	Mean	674.84	634.62	657.48				674.84	634.62	657.48
	Standard Deviation	59.69	43.05	52.94				59.69	43.05	52.94
	Minimum Observed	408.33	330.00	330.00				408.33	330.00	330.00
	25th Percentile	609.67	596.92	600.00				609.67	596.92	600.00
	50th Percentile (Median)	664.08	628.00	650.00				664.08	628.00	650.00
	75th Percentile	742.25	684.67	713.25				742.25	684.67	713.25
	Maximum Observed	970.00	838.17	970.00				970.00	838.17	970.00

Table 2. NIH Toolbox 2-minute Walk Endurance Test (feet) – Age 16		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	107	105	212	0	0	0	107	105	212
	Mean	690.68	644.50	671.99				690.68	644.50	671.99
	Standard Deviation	60.18	44.94	54.67				60.18	44.94	54.67
	Minimum Observed	481.83	470.00	470.00				481.83	470.00	470.00
	25th Percentile	633.17	580.00	601.58				633.17	580.00	601.58
	50th Percentile (Median)	679.50	643.50	672.17				679.50	643.50	672.17
	75th Percentile	750.00	718.00	738.08				750.00	718.00	738.08
	Maximum Observed	953.50	863.25	953.50				953.50	863.25	953.50

Table 2. NIH Toolbox 2-minute Walk Endurance Test (feet) – Age 17		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	108	112	220	0	0	0	108	112	220
	Mean	676.97	637.55	661.97				676.97	637.55	661.97
	Standard Deviation	68.15	44.96	58.42				68.15	44.96	58.42
	Minimum Observed	181.58	414.08	181.58				181.58	414.08	181.58
	25th Percentile	615.08	570.00	600.00				615.08	570.00	600.00
	50th Percentile (Median)	683.92	633.75	653.67				683.92	633.75	653.67
	75th Percentile	750.00	696.83	728.58				750.00	696.83	728.58
	Maximum Observed	930.00	915.75	930.00				930.00	915.75	930.00

Table 2. NIH Toolbox 2-minute Walk Endurance Test (feet) – Age 18-29		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	59	110	169	21	70	91	80	180	260
	Mean	700.37	614.47	655.40	675.83	568.36	602.56	698.06	606.69	648.28
	Standard Deviation	230.19	153.83	203.95	136.86	81.56	111.40	209.51	133.17	179.86
	Minimum Observed	500.00	367.58	367.58	490.17	360.67	360.67	490.17	360.67	360.67
	25th Percentile	641.25	564.08	585.58	613.33	527.42	550.00	635.00	557.08	580.00
	50th Percentile (Median)	699.50	618.83	650.00	634.83	573.92	600.25	691.00	612.33	645.00
	75th Percentile	786.92	664.58	720.00	739.50	612.08	650.00	784.42	662.25	707.33
	Maximum Observed	905.08	991.33	991.33	986.83	737.42	986.83	986.83	991.33	991.33

Table 2. NIH Toolbox 2-minute Walk Endurance Test (feet) – Age 30-39		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	54	149	203	21	74	95	75	223	298
	Mean	677.64	608.38	632.38	637.74	587.17	602.99	673.20	605.68	628.80
	Standard Deviation	194.06	144.91	168.21	101.53	67.07	78.38	173.86	124.79	146.25
	Minimum Observed	430.00	365.00	365.00	456.08	251.67	251.67	430.00	251.67	251.67
	25th Percentile	600.00	567.17	581.75	584.75	540.00	546.25	600.00	558.75	577.83
	50th Percentile (Median)	673.83	612.33	628.92	669.42	597.17	602.17	673.83	610.00	626.75
	75th Percentile	741.33	669.00	691.25	697.17	632.33	650.00	741.33	660.00	684.58
	Maximum Observed	888.67	855.00	888.67	800.00	760.00	800.00	888.67	855.00	888.67

Table 2. NIH Toolbox 2-minute Walk Endurance Test (feet) – Age 40-49		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	60	114	174	29	41	70	89	155	244
	Mean	653.01	623.85	636.36	600.79	567.81	585.00	646.40	618.75	630.88
	Standard Deviation	203.67	154.82	174.77	97.43	86.82	92.26	178.52	142.12	157.73
	Minimum Observed	300.00	370.00	300.00	415.50	372.08	372.08	300.00	370.00	300.00
	25th Percentile	594.92	575.25	582.17	532.92	510.00	515.58	589.08	571.58	578.00
	50th Percentile (Median)	663.25	616.42	638.00	610.75	578.17	600.00	654.17	613.75	628.67
	75th Percentile	711.00	697.42	703.08	666.42	620.00	639.50	703.08	696.50	700.00
	Maximum Observed	845.75	802.25	845.75	750.00	801.50	801.50	845.75	802.25	845.75

Table 2. NIH Toolbox 2-minute Walk Endurance Test (feet) – Age 50-59		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	54	78	132	23	23	46	77	101	178
	Mean	623.64	598.93	612.24	618.83	563.38	597.33	623.13	596.06	610.83
	Standard Deviation	228.80	131.04	178.76	118.51	82.01	105.61	201.45	122.39	162.96
	Minimum Observed	388.08	444.33	388.08	450.00	410.42	410.42	388.08	410.42	388.08
	25th Percentile	583.50	561.08	565.58	557.42	480.00	542.25	581.25	556.75	562.50
	50th Percentile (Median)	644.67	598.58	618.33	616.42	561.67	594.83	642.25	590.00	617.50
	75th Percentile	692.42	648.67	670.00	692.42	611.33	662.25	692.42	648.67	670.00
	Maximum Observed	790.00	756.08	790.00	843.92	703.33	843.92	843.92	756.08	843.92

Table 2. NIH Toolbox 2-minute Walk Endurance Test (feet) – Age 60-69		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	43	62	105	19	19	38	62	81	143
	Mean	600.04	547.51	574.78	526.63	465.92	503.25	592.51	541.67	568.49
	Standard Deviation	253.00	170.87	213.39	120.59	76.92	104.07	224.01	157.17	193.38
	Minimum Observed	300.00	300.08	300.00	237.50	233.42	233.42	237.50	233.42	233.42
	25th Percentile	543.00	500.00	510.25	473.58	424.83	439.83	536.58	490.00	507.50
	50th Percentile (Median)	603.42	550.00	573.75	561.75	476.83	523.42	598.33	543.67	569.17
	75th Percentile	659.08	611.08	641.17	585.42	530.00	567.25	653.50	610.33	639.00
	Maximum Observed	862.00	737.25	862.00	700.00	586.17	700.00	862.00	737.25	862.00

Table 2. NIH Toolbox 2-minute Walk Endurance Test (feet) – Age 70-85		English			Spanish			Total		All
		Males	Females	Total	Males	Females	Total	Males	Females	
	N	81	84	165	19	13	32	100	97	197
	Mean	516.20	471.56	497.85	512.92	426.03	484.39	516.03	469.88	497.24
	Standard Deviation	158.08	106.97	137.33	64.97	44.19	63.04	144.78	101.16	128.14
	Minimum Observed	291.67	212.08	212.08	301.92	340.08	301.92	291.67	212.08	212.08
	25th Percentile	447.83	416.67	428.00	450.00	382.58	413.50	447.83	416.67	428.00
	50th Percentile (Median)	513.25	470.25	495.67	513.17	400.00	464.83	513.25	468.42	495.67
	75th Percentile	600.00	532.08	564.42	579.00	450.00	535.58	600.00	532.08	564.42
	Maximum Observed	741.00	684.50	741.00	664.00	633.83	664.00	741.00	684.50	741.00

<b>Table 2. NIH Toolbox 2-minute Walk Endurance Test (feet) – NCS Sample of Mothers</b>		<b>English</b>	<b>Spanish</b>	<b>All</b>
	N	78	34	112
	Mean	623.24	593.25	614.13
	Standard Deviation	93.71	80.00	90.48
	Minimum Observed	300.08	403.00	300.08
	25th Percentile	567.42	549.50	560.58
	50th Percentile (Median)	631.04	589.92	612.17
	75th Percentile	683.33	625.50	669.50
	Maximum Observed	834.67	801.50	834.67

<b>Table 2. NIH Toolbox 2-minute Walk Endurance Test (feet) – NCS Sample of Pregnant Women</b>		<b>English</b>	<b>Spanish</b>	<b>All</b>
	N	77	42	119
	Mean	586.84	545.17	572.13
	Standard Deviation	99.99	60.34	90.02
	Minimum Observed	367.58	431.08	367.58
	25th Percentile	519.75	500.00	512.08
	50th Percentile (Median)	581.17	537.67	571.67
	75th Percentile	649.17	591.08	626.08
	Maximum Observed	991.33	666.00	991.33

Figure 1  
Least Squares Means

