



**Royal College of Surgeons in Ireland  
School of Physiotherapy**

**Maximum Voluntary Isometric Contraction (MVIC)  
Database of Normative Values**

## Notes

The following is a database of normative Maximum Voluntary Isometric Contraction (MVIC) values obtained from 494 healthy Irish subjects, utilising the Quantitative Muscle Assessment System (QMA) ([www.QMAsystem.com](http://www.QMAsystem.com)).

The methodology employed to generate the values in this database is published online in the journal 'Amyotrophic Lateral Sclerosis'.  
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## Demographic data on subjects in database

Healthy Subjects (n=494)	Males (n=235)			Females (n=259)		
	Mean (SD)	Min	Max	Mean (SD)	Min	Max
Age (years)	44.3 (15.2)	19	76	44.14 (14.6)	19	73
Weight (Kgs)	82.5 (11.7)	60	127	66.3 (11.19)	43	103
Height (m)	1.76 (0.08)	1.5	1.93	1.62 (0.06)	1.43	1.83
<b>Limb Dominance</b>	<b>Males (n=235)</b>			<b>Females (n=259)</b>		
Right Hand dominant		213			237	
Left Hand dominant		20			22	
Ambidextrous		2			0	
<b>Numbers in each age decade</b>						
20-29		53			54	
30-39		51			51	
40-49		40			53	
50-59		41			50	
60-69		46			46	
70-79		4			5	

### Neck Flexion 50th Percentile Values (KGs)

Age	Men	Women
20	15.1 [14.5,15.7]	12.0 [11.4,12.6]
25	14.6 [14.1,15.2]	11.5 [11.0,12.1]
30	14.2 [13.7,14.6]	11.1 [10.6,11.5]
35	13.7 [13.2,14.1]	10.6 [10.2,11.0]
40	13.2 [12.8,13.6]	10.1 [9.7,10.5]
45	12.8 [12.4,13.2]	9.7 [9.3,10.1]
50	12.3 [11.9,12.7]	9.2 [8.8,9.6]
55	11.8 [11.4,12.3]	8.7 [8.3,9.2]
60	11.4 [10.9,11.9]	8.3 [7.8,8.8]
65	10.9 [10.3,11.5]	7.8 [7.3,8.4]
70	10.4 [9.8,11.1]	7.4 [6.7,8.0]

[95% Confidence Interval]

### Neck Flexion 10th Percentile Values (KGs)

Age	Men	Women
20	10.1 [9.2,11.1]	8.1 [7.0,9.2]
25	9.9 [9.1,10.7]	7.8 [6.9,8.8]
30	9.6 [8.9,10.4]	7.6 [6.7,8.4]
35	9.4 [8.7,10.1]	7.3 [6.6,8.1]
40	9.1 [8.4,9.8]	7.1 [6.4,7.7]
45	8.8 [8.1,9.5]	6.8 [6.2,7.4]
50	8.6 [7.8,9.3]	6.5 [5.9,7.2]
55	8.3 [7.5,9.1]	6.3 [5.6,6.9]
60	8.1 [7.1,9.0]	6.0 [5.3,6.7]
65	7.8 [6.8,8.8]	5.8 [4.9,6.6]
70	7.5 [6.4,8.7]	5.5 [4.6,6.4]

[95% Confidence Interval]

### Neck Flexion 5th Percentile Values (KGs)

Age	Sex	
	Men	Women
20	9.6 [8.6,10.6]	7.1 [5.8,8.3]
25	9.3 [8.4,10.2]	6.8 [5.6,7.9]
30	9.0 [8.2,9.8]	6.5 [5.5,7.5]
35	8.8 [8.0,9.5]	6.2 [5.4,7.1]
40	8.5 [7.7,9.3]	6.0 [5.2,6.7]
45	8.2 [7.4,9.0]	5.7 [5.0,6.4]
50	7.9 [7.1,8.8]	5.4 [4.7,6.1]
55	7.7 [6.7,8.6]	5.1 [4.4,5.8]
60	7.4 [6.3,8.5]	4.9 [4.1,5.6]
65	7.1 [5.9,8.4]	4.6 [3.7,5.5]
70	6.8 [5.5,8.2]	4.3 [3.3,5.3]

[95% Confidence Interval]

### Shoulder Abduction 50th Percentile Values (KGs)

Age	L		R	
	Men	Women	Men	Women
20	18.6 [17.3,19.9]	10.0 [8.7,11.2]	19.9 [18.6,21.1]	11.2 [9.9,12.5]
25	19.0 [18.3,19.7]	10.3 [9.6,11.0]	20.2 [19.5,20.9]	11.6 [10.9,12.2]
30	18.8 [18.2,19.4]	10.1 [9.5,10.8]	20.0 [19.4,20.7]	11.4 [10.8,12.0]
35	18.4 [17.7,19.0]	9.7 [9.1,10.3]	19.6 [19.0,20.3]	10.9 [10.3,11.6]
40	17.8 [17.2,18.4]	9.1 [8.5,9.8]	19.0 [18.4,19.7]	10.4 [9.8,11.0]
45	17.1 [16.5,17.8]	8.5 [7.9,9.1]	18.4 [17.8,19.0]	9.7 [9.1,10.3]
50	16.5 [15.9,17.0]	7.8 [7.2,8.4]	17.7 [17.1,18.3]	9.0 [8.5,9.6]
55	15.7 [15.1,16.3]	7.1 [6.5,7.6]	17.0 [16.4,17.6]	8.3 [7.7,8.9]
60	15.0 [14.3,15.6]	6.3 [5.7,7.0]	16.2 [15.6,16.9]	7.6 [6.9,8.2]
65	14.2 [13.5,15.0]	5.6 [4.8,6.3]	15.5 [14.7,16.2]	6.8 [6.1,7.5]
70	13.4 [12.6,14.3]	4.8 [3.9,5.6]	14.7 [13.8,15.6]	6.0 [5.2,6.9]

[95% Confidence Interval]

### Shoulder Abduction 10th Percentile Values (KGs)

Age	L		R	
	Men	Women	Men	Women
20	12.2 [11.0,13.3]	7.1 [6.0,8.3]	12.8 [11.7,13.9]	7.8 [6.6,8.9]
25	11.3 [10.6,12.0]	6.3 [5.5,7.0]	11.9 [11.3,12.6]	6.9 [6.2,7.6]
30	10.8 [10.2,11.4]	5.7 [5.0,6.4]	11.4 [10.8,12.0]	6.4 [5.7,7.0]
35	10.3 [9.7,11.0]	5.3 [4.6,6.0]	11.0 [10.4,11.6]	5.9 [5.3,6.6]
40	10.0 [9.3,10.6]	4.9 [4.2,5.7]	10.6 [10.0,11.2]	5.6 [4.9,6.3]
45	9.6 [9.0,10.2]	4.6 [3.9,5.2]	10.2 [9.6,10.9]	5.2 [4.6,5.9]
50	9.2 [8.6,9.8]	4.2 [3.6,4.8]	9.8 [9.2,10.5]	4.8 [4.2,5.4]
55	8.7 [8.1,9.4]	3.7 [3.2,4.3]	9.4 [8.7,10.0]	4.3 [3.8,4.9]
60	8.2 [7.5,8.9]	3.2 [2.6,3.8]	8.9 [8.1,9.6]	3.8 [3.2,4.4]
65	7.6 [6.7,8.5]	2.6 [1.9,3.3]	8.3 [7.3,9.2]	3.2 [2.5,4.0]
70	7.0 [5.8,8.1]	1.9 [0.9,2.9]	7.6 [6.4,8.8]	2.6 [1.5,3.6]

[95% Confidence Interval]



### Shoulder Abduction 5th Percentile Values (KGs)

Age	L		R	
	Men	Women	Men	Women
20	11.5 [10.1,12.9]	7.0 [5.5,8.6]	11.8 [10.3,13.2]	7.3 [5.8,8.8]
25	10.3 [9.5,11.1]	5.8 [4.8,6.9]	10.6 [9.7,11.4]	6.1 [5.1,7.1]
30	9.6 [8.8,10.3]	5.1 [4.1,6.1]	9.8 [9.0,10.6]	5.4 [4.5,6.3]
35	9.1 [8.2,9.9]	4.6 [3.6,5.6]	9.3 [8.5,10.2]	4.9 [4.0,5.8]
40	8.7 [7.8,9.5]	4.2 [3.2,5.2]	8.9 [8.1,9.8]	4.5 [3.6,5.4]
45	8.3 [7.5,9.1]	3.8 [2.9,4.8]	8.6 [7.7,9.4]	4.1 [3.3,5.0]
50	7.9 [7.1,8.7]	3.5 [2.7,4.3]	8.2 [7.4,9.1]	3.8 [3.0,4.5]
55	7.5 [6.7,8.3]	3.1 [2.3,3.8]	7.8 [6.9,8.7]	3.4 [2.7,4.1]
60	7.1 [6.2,8.0]	2.7 [1.9,3.4]	7.4 [6.4,8.4]	2.9 [2.2,3.7]
65	6.6 [5.5,7.8]	2.2 [1.2,3.1]	6.9 [5.6,8.2]	2.5 [1.5,3.4]
70	6.1 [4.5,7.6]	1.6 [0.3,3.0]	6.4 [4.7,8.0]	1.9 [0.6,3.3]

[95% Confidence Interval]

### Shoulder Adduction 50th Percentile Values (KGs)

Age	L		R	
	Men	Women	Men	Women
20	31.8 [30.6,33.0]	18.3 [17.1,19.4]	33.0 [31.8,34.2]	19.5 [18.3,20.6]
25	31.2 [30.2,32.3]	17.7 [16.7,18.7]	32.4 [31.4,33.5]	18.9 [17.9,19.9]
30	30.7 [29.7,31.7]	17.1 [16.2,18.1]	31.9 [30.9,32.9]	18.3 [17.4,19.3]
35	30.1 [29.2,31.0]	16.6 [15.7,17.5]	31.3 [30.4,32.2]	17.8 [16.9,18.7]
40	29.5 [28.7,30.4]	16.0 [15.2,16.9]	30.7 [29.9,31.6]	17.2 [16.4,18.0]
45	29.0 [28.1,29.8]	15.5 [14.6,16.3]	30.2 [29.3,31.0]	16.6 [15.8,17.5]
50	28.4 [27.5,29.3]	14.9 [14.0,15.7]	29.6 [28.7,30.5]	16.1 [15.2,16.9]
55	27.9 [26.9,28.8]	14.3 [13.4,15.2]	29.0 [28.1,30.0]	15.5 [14.6,16.4]
60	27.3 [26.3,28.3]	13.8 [12.8,14.7]	28.5 [27.5,29.5]	15.0 [14.0,15.9]
65	26.7 [25.6,27.8]	13.2 [12.1,14.3]	27.9 [26.8,29.0]	14.4 [13.3,15.5]
70	26.2 [25.0,27.4]	12.6 [11.4,13.8]	27.4 [26.2,28.5]	13.8 [12.6,15.0]

[95% Confidence Interval]

### Shoulder Adduction 10th Percentile Values (KGs)

Age	L		R	
	Men	Women	Men	Women
20	21.4 [20.0,22.7]	11.8 [10.3,13.3]	21.6 [20.2,23.0]	12.1 [10.4,13.7]
25	21.1 [19.9,22.3]	11.5 [10.2,12.9]	21.3 [20.1,22.6]	11.8 [10.3,13.3]
30	20.8 [19.7,21.9]	11.3 [10.0,12.5]	21.1 [19.9,22.2]	11.5 [10.1,12.9]
35	20.5 [19.5,21.6]	11.0 [9.9,12.1]	20.8 [19.7,21.8]	11.2 [10.0,12.5]
40	20.3 [19.2,21.4]	10.7 [9.7,11.8]	20.5 [19.5,21.5]	11.0 [9.8,12.1]
45	20.0 [18.9,21.1]	10.5 [9.5,11.4]	20.3 [19.2,21.3]	10.7 [9.6,11.8]
50	19.7 [18.5,20.9]	10.2 [9.2,11.2]	20.0 [18.9,21.1]	10.4 [9.4,11.5]
55	19.5 [18.1,20.8]	9.9 [8.9,11.0]	19.7 [18.5,20.9]	10.2 [9.1,11.2]
60	19.2 [17.7,20.7]	9.6 [8.5,10.8]	19.4 [18.1,20.7]	9.9 [8.8,11.0]
65	18.9 [17.3,20.5]	9.4 [8.1,10.6]	19.2 [17.7,20.6]	9.6 [8.4,10.8]
70	18.6 [16.9,20.4]	9.1 [7.7,10.5]	18.9 [17.3,20.5]	9.3 [8.0,10.7]

[95% Confidence Interval]

### Shoulder Adduction 5th Percentile Values (KGs)

Age	L		R	
	Men	Women	Men	Women
20	19.4 [18.0,20.8]	10.0 [8.0,12.1]	19.8 [18.1,21.4]	10.4 [8.0,12.8]
25	19.1 [17.8,20.4]	9.7 [7.9,11.6]	19.5 [18.0,20.9]	10.1 [7.9,12.2]
30	18.8 [17.6,20.1]	9.4 [7.8,11.1]	19.2 [17.8,20.5]	9.8 [7.8,11.7]
35	18.5 [17.2,19.8]	9.1 [7.7,10.6]	18.9 [17.6,20.1]	9.5 [7.7,11.2]
40	18.2 [16.9,19.6]	8.8 [7.5,10.2]	18.6 [17.3,19.8]	9.2 [7.6,10.7]
45	17.9 [16.4,19.4]	8.5 [7.3,9.8]	18.3 [16.9,19.6]	8.9 [7.5,10.3]
50	17.6 [15.9,19.3]	8.2 [7.0,9.5]	18.0 [16.5,19.4]	8.6 [7.3,9.9]
55	17.3 [15.4,19.2]	7.9 [6.7,9.2]	17.7 [16.0,19.3]	8.3 [7.0,9.5]
60	17.0 [14.9,19.1]	7.7 [6.3,9.0]	17.4 [15.6,19.2]	8.0 [6.7,9.3]
65	16.7 [14.4,19.1]	7.4 [5.8,8.9]	17.1 [15.0,19.1]	7.7 [6.3,9.0]
70	16.4 [13.8,19.0]	7.1 [5.3,8.8]	16.8 [14.5,19.0]	7.4 [5.9,8.9]

[95% Confidence Interval]

### Elbow Flexion 50th Percentile Values (KGs)

Age	L		R	
	Men	Women	Men	Women
20	29.0 [27.8,30.1]	18.0 [16.8,19.1]	29.5 [28.4,30.7]	18.5 [17.4,19.7]
25	29.2 [28.5,29.9]	18.2 [17.5,18.9]	29.8 [29.1,30.5]	18.8 [18.1,19.5]
30	29.1 [28.5,29.8]	18.1 [17.6,18.7]	29.7 [29.1,30.3]	18.7 [18.2,19.3]
35	28.9 [28.3,29.5]	17.9 [17.3,18.5]	29.5 [28.9,30.1]	18.5 [17.9,19.1]
40	28.6 [27.9,29.2]	17.6 [17.0,18.2]	29.2 [28.5,29.8]	18.2 [17.6,18.8]
45	28.1 [27.5,28.7]	17.1 [16.5,17.7]	28.7 [28.1,29.3]	17.7 [17.1,18.3]
50	27.6 [27.0,28.1]	16.6 [16.0,17.1]	28.2 [27.6,28.7]	17.2 [16.6,17.7]
55	27.0 [26.4,27.5]	16.0 [15.4,16.5]	27.5 [27.0,28.1]	16.5 [16.0,17.1]
60	26.3 [25.7,26.9]	15.3 [14.7,15.9]	26.9 [26.2,27.5]	15.9 [15.3,16.5]
65	25.5 [24.8,26.2]	14.5 [13.8,15.2]	26.1 [25.4,26.8]	15.1 [14.4,15.8]
70	24.7 [23.8,25.6]	13.7 [12.8,14.5]	25.3 [24.4,26.1]	14.3 [13.4,15.1]

[95% Confidence Interval]

### Elbow Flexion 10th Percentile Values (KGs)

Age	L		R	
	Men	Women	Men	Women
20	23.5 [22.4, 24.5]	14.8 [13.6, 16.0]	23.5 [22.5, 24.4]	14.8 [13.7, 15.9]
25	23.5 [22.6, 24.4]	14.8 [13.7, 15.9]	23.5 [22.6, 24.3]	14.8 [13.8, 15.8]
30	23.4 [22.6, 24.2]	14.8 [13.8, 15.7]	23.4 [22.6, 24.2]	14.8 [13.9, 15.6]
35	23.3 [22.5, 24.1]	14.6 [13.7, 15.5]	23.3 [22.5, 24.1]	14.6 [13.8, 15.5]
40	23.1 [22.3, 23.9]	14.4 [13.6, 15.3]	23.1 [22.3, 23.9]	14.4 [13.6, 15.2]
45	22.8 [21.9, 23.6]	14.1 [13.2, 15.0]	22.8 [21.9, 23.7]	14.1 [13.3, 14.9]
50	22.3 [21.4, 23.2]	13.6 [12.8, 14.5]	22.3 [21.3, 23.3]	13.6 [12.8, 14.5]
55	21.6 [20.7, 22.5]	12.9 [12.1, 13.8]	21.6 [20.6, 22.6]	12.9 [12.1, 13.8]
60	20.7 [19.7, 21.7]	12.0 [11.3, 12.8]	20.7 [19.7, 21.7]	12.0 [11.2, 12.8]
65	19.5 [18.5, 20.6]	10.9 [10.0, 11.8]	19.5 [18.4, 20.7]	10.9 [10.0, 11.8]
70	18.1 [16.6, 19.6]	9.4 [8.0, 10.8]	18.1 [16.5, 19.7]	9.4 [8.0, 10.8]

[95% Confidence Interval]

### Elbow Flexion 5th Percentile Values (KGs)

Age	L		R	
	Men	Women	Men	Women
20	21.8 [19.5,24.0]	13.7 [11.0,16.4]	22.7 [20.4,25.0]	14.6 [11.9,17.4]
25	21.5 [20.3,22.7]	13.4 [11.7,15.2]	22.4 [21.2,23.7]	14.4 [12.7,16.1]
30	21.1 [19.9,22.2]	13.0 [11.5,14.5]	22.0 [20.9,23.1]	14.0 [12.6,15.4]
35	20.6 [19.3,21.9]	12.5 [11.0,14.0]	21.5 [20.3,22.8]	13.5 [12.1,14.8]
40	20.1 [18.7,21.5]	12.0 [10.6,13.5]	21.0 [19.7,22.3]	13.0 [11.7,14.3]
45	19.5 [18.1,20.9]	11.5 [10.1,12.8]	20.5 [19.1,21.8]	12.4 [11.2,13.6]
50	19.0 [17.6,20.4]	10.9 [9.7,12.1]	19.9 [18.5,21.3]	11.9 [10.8,12.9]
55	18.4 [17.0,19.8]	10.4 [9.3,11.4]	19.4 [17.9,20.8]	11.3 [10.3,12.3]
60	17.9 [16.3,19.4]	9.8 [8.7,10.9]	18.8 [17.2,20.4]	10.7 [9.6,11.9]
65	17.3 [15.6,19.0]	9.3 [8.0,10.5]	18.3 [16.4,20.1]	10.2 [8.9,11.5]
70	16.8 [14.8,18.8]	8.7 [7.2,10.2]	17.7 [15.6,19.9]	9.7 [8.0,11.3]

[95% Confidence Interval]

**Elbow Extension 50th Percentile Values (KGs)**

Age	L		R	
	Men	Women	Men	Women
20	17.5 [17.0,18.1]	9.6 [9.0,10.2]	18.3 [17.7,18.9]	10.4 [9.8,11.0]
25	17.6 [17.1,18.1]	9.7 [9.2,10.2]	18.4 [17.9,18.9]	10.5 [10.0,11.0]
30	17.7 [17.3,18.2]	9.8 [9.4,10.3]	18.5 [18.1,18.9]	10.6 [10.2,11.0]
35	17.8 [17.4,18.2]	9.9 [9.5,10.3]	18.6 [18.2,19.0]	10.7 [10.3,11.1]
40	17.8 [17.4,18.3]	9.9 [9.5,10.3]	18.6 [18.2,19.0]	10.7 [10.3,11.1]
45	17.8 [17.3,18.3]	9.9 [9.5,10.3]	18.6 [18.1,19.1]	10.7 [10.2,11.1]
50	17.7 [17.2,18.2]	9.8 [9.3,10.2]	18.5 [18.0,19.0]	10.6 [10.1,11.0]
55	17.5 [17.0,17.9]	9.6 [9.1,10.0]	18.2 [17.8,18.7]	10.3 [9.9,10.8]
60	17.1 [16.6,17.6]	9.2 [8.7,9.6]	17.9 [17.4,18.3]	10.0 [9.5,10.4]
65	16.6 [16.0,17.1]	8.6 [8.1,9.2]	17.3 [16.8,17.9]	9.4 [8.9,10.0]
70	15.8 [15.0,16.6]	7.9 [7.1,8.7]	16.6 [15.8,17.4]	8.7 [7.9,9.5]

[95% Confidence Interval]



### Elbow Extension 10th Percentile Values (KGs)

Age	L		R	
	Men	Women	Men	Women
20	13.8 [13.3,14.4]	7.6 [6.9,8.2]	14.6 [14.0,15.2]	8.3 [7.6,9.0]
25	13.9 [13.4,14.4]	7.6 [7.0,8.2]	14.6 [14.1,15.1]	8.3 [7.7,9.0]
30	13.9 [13.4,14.4]	7.7 [7.1,8.2]	14.6 [14.2,15.1]	8.4 [7.8,8.9]
35	13.9 [13.4,14.4]	7.7 [7.2,8.2]	14.6 [14.2,15.1]	8.4 [7.9,8.9]
40	13.9 [13.4,14.4]	7.6 [7.1,8.1]	14.6 [14.1,15.1]	8.3 [7.9,8.8]
45	13.7 [13.2,14.3]	7.5 [7.0,8.0]	14.5 [13.9,15.0]	8.2 [7.7,8.7]
50	13.5 [12.9,14.1]	7.2 [6.7,7.8]	14.2 [13.7,14.8]	8.0 [7.5,8.5]
55	13.2 [12.6,13.7]	6.9 [6.4,7.4]	13.9 [13.3,14.4]	7.6 [7.1,8.1]
60	12.6 [12.1,13.2]	6.4 [5.9,6.9]	13.4 [12.8,14.0]	7.1 [6.6,7.6]
65	12.0 [11.3,12.6]	5.7 [5.1,6.3]	12.7 [12.0,13.4]	6.4 [5.8,7.0]
70	11.1 [10.2,12.0]	4.8 [4.0,5.7]	11.8 [10.9,12.7]	5.5 [4.7,6.4]

[95% Confidence Interval]

### Elbow Extension 5th Percentile Values (KGs)

Age	R			
	L		R	
	Men	Women	Men	Women
20	13.3 [12.6,14.1]	7.1 [6.2,8.0]	13.8 [13.1,14.6]	7.6 [6.7,8.6]
25	13.3 [12.7,14.0]	7.1 [6.3,7.9]	13.8 [13.2,14.5]	7.6 [6.8,8.4]
30	13.3 [12.7,13.9]	7.0 [6.3,7.8]	13.8 [13.2,14.3]	7.6 [6.8,8.3]
35	13.2 [12.6,13.8]	7.0 [6.3,7.6]	13.7 [13.1,14.2]	7.5 [6.8,8.1]
40	13.0 [12.4,13.7]	6.8 [6.2,7.5]	13.6 [13.0,14.1]	7.3 [6.7,7.9]
45	12.8 [12.1,13.6]	6.6 [6.0,7.3]	13.4 [12.7,14.0]	7.1 [6.6,7.7]
50	12.6 [11.8,13.4]	6.4 [5.7,7.0]	13.1 [12.4,13.8]	6.9 [6.3,7.5]
55	12.3 [11.5,13.0]	6.0 [5.4,6.6]	12.8 [12.0,13.5]	6.6 [6.0,7.1]
60	11.8 [11.1,12.6]	5.6 [5.1,6.2]	12.3 [11.6,13.1]	6.1 [5.5,6.7]
65	11.3 [10.5,12.1]	5.1 [4.4,5.7]	11.8 [10.9,12.7]	5.6 [4.8,6.3]
70	10.6 [9.5,11.7]	4.4 [3.4,5.4]	11.1 [9.9,12.4]	4.9 [3.8,6.1]

[95% Confidence Interval]

### Hip Flexion 50th Percentile Values (KGs)

Age	L		R	
	Men	Women	Men	Women
20	27.5 [26.6,28.4]	20.2 [19.3,21.1]	28.2 [27.3,29.2]	20.9 [20.0,21.8]
25	26.9 [26.1,27.7]	19.6 [18.7,20.4]	27.6 [26.8,28.5]	20.3 [19.5,21.1]
30	26.3 [25.5,27.1]	19.0 [18.2,19.7]	27.0 [26.3,27.8]	19.7 [18.9,20.4]
35	25.7 [25.0,26.4]	18.4 [17.7,19.0]	26.4 [25.7,27.1]	19.1 [18.4,19.8]
40	25.1 [24.4,25.8]	17.7 [17.1,18.4]	25.8 [25.1,26.5]	18.5 [17.8,19.1]
45	24.5 [23.8,25.2]	17.1 [16.5,17.8]	25.2 [24.5,25.9]	17.9 [17.2,18.5]
50	23.9 [23.2,24.6]	16.5 [15.9,17.2]	24.6 [23.9,25.3]	17.3 [16.6,17.9]
55	23.3 [22.6,24.0]	15.9 [15.2,16.7]	24.0 [23.3,24.7]	16.7 [15.9,17.4]
60	22.7 [21.9,23.5]	15.3 [14.6,16.1]	23.4 [22.6,24.2]	16.1 [15.3,16.8]
65	22.1 [21.2,22.9]	14.7 [13.9,15.6]	22.8 [21.9,23.7]	15.4 [14.6,16.3]
70	21.5 [20.5,22.4]	14.1 [13.2,15.1]	22.2 [21.2,23.1]	14.8 [13.9,15.8]

[95% Confidence Interval]

### Hip Flexion 10th Percentile Values (KGs)

Age	L		R	
	Men	Women	Men	Women
20	19.3 [18.3,20.2]	13.7 [12.7,14.7]	20.3 [19.4,21.3]	14.8 [13.7,15.8]
25	19.0 [18.1,19.8]	13.4 [12.5,14.3]	20.0 [19.1,20.9]	14.4 [13.5,15.4]
30	18.6 [17.8,19.4]	13.1 [12.2,13.9]	19.7 [18.9,20.5]	14.1 [13.2,15.0]
35	18.3 [17.5,19.1]	12.7 [12.0,13.5]	19.4 [18.6,20.1]	13.8 [13.0,14.6]
40	18.0 [17.2,18.7]	12.4 [11.7,13.1]	19.0 [18.3,19.7]	13.4 [12.7,14.2]
45	17.6 [16.9,18.4]	12.1 [11.4,12.8]	18.7 [18.0,19.4]	13.1 [12.4,13.8]
50	17.3 [16.5,18.1]	11.7 [11.0,12.4]	18.4 [17.6,19.1]	12.8 [12.0,13.5]
55	17.0 [16.1,17.8]	11.4 [10.7,12.1]	18.0 [17.2,18.8]	12.4 [11.7,13.2]
60	16.6 [15.7,17.6]	11.1 [10.3,11.9]	17.7 [16.8,18.6]	12.1 [11.3,12.9]
65	16.3 [15.3,17.3]	10.7 [9.9,11.6]	17.4 [16.4,18.3]	11.8 [10.9,12.7]
70	16.0 [14.9,17.1]	10.4 [9.4,11.4]	17.0 [16.0,18.1]	11.5 [10.5,12.4]

[95% Confidence Interval]

### Hip Flexion 5th Percentile Values (KGs)

Age	L		R	
	Men	Women	Men	Women
20	18.0 [16.1,19.9]	12.4 [10.2,14.6]	19.2 [17.4,21.0]	13.7 [11.4,15.9]
25	17.7 [15.9,19.4]	12.1 [10.1,14.1]	18.9 [17.3,20.6]	13.4 [11.3,15.4]
30	17.4 [15.7,19.0]	11.8 [10.0,13.6]	18.6 [17.1,20.1]	13.1 [11.2,14.9]
35	17.0 [15.5,18.6]	11.5 [9.9,13.1]	18.3 [16.8,19.8]	12.8 [11.0,14.5]
40	16.7 [15.2,18.3]	11.2 [9.7,12.7]	18.0 [16.5,19.4]	12.4 [10.8,14.0]
45	16.4 [14.9,18.0]	10.9 [9.5,12.3]	17.7 [16.2,19.2]	12.1 [10.6,13.7]
50	16.1 [14.5,17.8]	10.6 [9.2,12.0]	17.4 [15.8,18.9]	11.8 [10.3,13.3]
55	15.8 [14.0,17.6]	10.3 [8.8,11.7]	17.1 [15.3,18.8]	11.5 [10.0,13.1]
60	15.5 [13.5,17.4]	10.0 [8.4,11.5]	16.7 [14.9,18.6]	11.2 [9.6,12.8]
65	15.2 [13.1,17.3]	9.6 [8.0,11.3]	16.4 [14.4,18.5]	10.9 [9.1,12.7]
70	14.9 [12.5,17.2]	9.3 [7.5,11.2]	16.1 [13.8,18.4]	10.6 [8.7,12.5]

[95% Confidence Interval]

### Knee Extension 50th Percentile Values (KGs)

Age	L		R	
	Men	Women	Men	Women
20	47.5 [45.1, 49.9]	31.4 [29.0, 33.8]	49.6 [47.2, 52.0]	33.5 [31.1, 35.9]
25	45.3 [43.8, 46.7]	29.1 [27.7, 30.5]	47.4 [45.9, 48.8]	31.2 [29.8, 32.6]
30	43.9 [42.6, 45.1]	27.7 [26.5, 28.9]	46.0 [44.7, 47.2]	29.8 [28.6, 31.0]
35	42.8 [41.5, 44.1]	26.6 [25.4, 27.9]	44.9 [43.6, 46.2]	28.8 [27.5, 30.0]
40	41.8 [40.6, 43.1]	25.7 [24.5, 26.9]	43.9 [42.7, 45.2]	27.8 [26.6, 29.0]
45	40.9 [39.6, 42.1]	24.7 [23.5, 26.0]	43.0 [41.7, 44.3]	26.8 [25.6, 28.1]
50	39.8 [38.6, 41.1]	23.7 [22.5, 24.9]	41.9 [40.7, 43.2]	25.8 [24.6, 27.0]
55	38.7 [37.5, 39.9]	22.5 [21.4, 23.7]	40.8 [39.6, 42.0]	24.6 [23.5, 25.8]
60	37.3 [36.1, 38.6]	21.2 [20.0, 22.4]	39.4 [38.2, 40.7]	23.3 [22.1, 24.5]
65	35.8 [34.3, 37.3]	19.7 [18.2, 21.2]	37.9 [36.4, 39.4]	21.8 [20.3, 23.3]
70	34.1 [32.1, 36.0]	17.9 [16.0, 19.9]	36.2 [34.2, 38.1]	20.0 [18.1, 22.0]

[95% Confidence Interval]

### Knee Extension 10th Percentile Values (KGs)

Age	L		R	
	Men	Women	Men	Women
20	31.9 [29.3, 34.4]	21.9 [19.4, 24.4]	33.5 [31.0, 36.1]	23.6 [21.0, 26.2]
25	31.2 [29.7, 32.7]	21.2 [19.8, 22.7]	32.9 [31.4, 34.4]	22.9 [21.3, 24.6]
30	30.7 [29.4, 32.0]	20.7 [19.4, 22.0]	32.4 [31.1, 33.6]	22.4 [20.9, 23.8]
35	30.1 [28.8, 31.5]	20.1 [18.8, 21.5]	31.8 [30.5, 33.1]	21.8 [20.3, 23.3]
40	29.4 [28.0, 30.8]	19.4 [18.1, 20.8]	31.1 [29.8, 32.4]	21.1 [19.7, 22.6]
45	28.6 [27.2, 30.0]	18.6 [17.3, 20.0]	30.3 [29.0, 31.6]	20.3 [18.9, 21.7]
50	27.6 [26.2, 29.0]	17.6 [16.4, 18.9]	29.3 [28.0, 30.6]	19.3 [18.0, 20.6]
55	26.4 [25.0, 27.8]	16.4 [15.2, 17.6]	28.1 [26.8, 29.4]	18.1 [16.9, 19.4]
60	25.0 [23.4, 26.6]	15.0 [13.8, 16.3]	26.7 [25.3, 28.1]	16.7 [15.4, 18.0]
65	23.3 [21.5, 25.2]	13.4 [11.8, 14.9]	25.0 [23.3, 26.8]	15.0 [13.5, 16.6]
70	21.4 [19.1, 23.8]	11.4 [9.4, 13.4]	23.1 [20.8, 25.3]	13.1 [11.1, 15.1]

[95% Confidence Interval]

### Knee Extension 5th Percentile Values (KGs)

Age	L		R	
	Men	Women	Men	Women
20	31.1 [28.5, 33.7]	21.7 [18.9, 24.5]	32.3 [29.5, 35.0]	22.9 [19.9, 25.8]
25	29.6 [28.0, 31.1]	20.2 [18.3, 22.0]	30.8 [29.1, 32.4]	21.4 [19.4, 23.3]
30	28.5 [27.2, 29.9]	19.1 [17.4, 20.8]	29.7 [28.3, 31.1]	20.3 [18.6, 22.0]
35	27.7 [26.2, 29.1]	18.3 [16.6, 20.0]	28.9 [27.4, 30.3]	19.5 [17.8, 21.2]
40	26.8 [25.3, 28.4]	17.4 [15.7, 19.1]	28.0 [26.6, 29.5]	18.6 [17.0, 20.3]
45	25.9 [24.4, 27.5]	16.5 [14.9, 18.1]	27.1 [25.6, 28.6]	17.7 [16.2, 19.3]
50	24.9 [23.3, 26.4]	15.5 [14.0, 17.0]	26.1 [24.6, 27.5]	16.7 [15.2, 18.1]
55	23.7 [22.0, 25.3]	14.3 [12.8, 15.7]	24.9 [23.3, 26.4]	15.5 [14.1, 16.8]
60	22.2 [20.4, 24.1]	12.9 [11.4, 14.3]	23.4 [21.7, 25.2]	14.1 [12.7, 15.4]
65	20.6 [18.4, 22.8]	11.2 [9.5, 12.9]	21.8 [19.7, 23.9]	12.4 [10.8, 14.0]
70	18.7 [16.0, 21.5]	9.3 [7.1, 11.6]	19.9 [17.2, 22.7]	10.5 [8.4, 12.7]

[95% Confidence Interval]



### Knee Flexion 50th Percentile Values (KGs)

Age	L		R	
	Men	Women	Men	Women
20	24.5 [23.2,25.9]	16.2 [14.9,17.6]	25.7 [24.4,27.1]	17.4 [16.1,18.8]
25	23.3 [22.5,24.1]	15.0 [14.2,15.8]	24.5 [23.7,25.3]	16.2 [15.4,17.0]
30	22.6 [21.9,23.2]	14.2 [13.6,14.9]	23.8 [23.1,24.5]	15.5 [14.8,16.1]
35	22.0 [21.3,22.7]	13.7 [13.0,14.4]	23.2 [22.5,23.9]	14.9 [14.2,15.6]
40	21.5 [20.8,22.2]	13.2 [12.5,13.9]	22.7 [22.0,23.4]	14.4 [13.7,15.1]
45	21.0 [20.3,21.7]	12.7 [12.0,13.4]	22.2 [21.5,22.9]	13.9 [13.2,14.6]
50	20.5 [19.8,21.2]	12.2 [11.5,12.8]	21.7 [21.0,22.4]	13.4 [12.7,14.0]
55	19.9 [19.2,20.6]	11.6 [10.9,12.2]	21.1 [20.5,21.8]	12.8 [12.2,13.4]
60	19.2 [18.5,19.9]	10.9 [10.2,11.6]	20.5 [19.8,21.2]	12.1 [11.5,12.8]
65	18.5 [17.7,19.3]	10.2 [9.3,11.0]	19.7 [18.9,20.5]	11.4 [10.6,12.2]
70	17.6 [16.6,18.7]	9.3 [8.2,10.4]	18.8 [17.8,19.9]	10.5 [9.4,11.6]

[95% Confidence Interval]

### Knee Flexion 10th Percentile Values (KGs)

Age	L		R	
	Men	Women	Men	Women
20	17.3 [15.4,19.3]	12.5 [10.4,14.6]	17.8 [15.8,19.8]	13.0 [10.9,15.1]
25	15.9 [14.7,17.0]	11.0 [9.8,12.3]	16.4 [15.2,17.5]	11.5 [10.2,12.8]
30	15.0 [14.0,16.0]	10.1 [9.0,11.2]	15.5 [14.5,16.4]	10.6 [9.5,11.7]
35	14.3 [13.3,15.3]	9.5 [8.4,10.6]	14.8 [13.8,15.8]	10.0 [8.8,11.1]
40	13.8 [12.7,14.8]	8.9 [7.8,10.0]	14.2 [13.2,15.3]	9.4 [8.3,10.5]
45	13.2 [12.1,14.3]	8.4 [7.3,9.4]	13.7 [12.6,14.8]	8.8 [7.8,9.9]
50	12.6 [11.6,13.7]	7.8 [6.8,8.8]	13.1 [12.1,14.2]	8.3 [7.3,9.3]
55	12.0 [10.9,13.1]	7.2 [6.2,8.1]	12.5 [11.4,13.5]	7.6 [6.7,8.6]
60	11.3 [10.1,12.5]	6.4 [5.5,7.4]	11.8 [10.6,12.9]	6.9 [5.9,7.9]
65	10.5 [9.0,11.9]	5.6 [4.4,6.8]	11.0 [9.6,12.4]	6.1 [4.9,7.3]
70	9.6 [7.7,11.4]	4.7 [3.2,6.3]	10.0 [8.3,11.8]	5.2 [3.7,6.7]

[95% Confidence Interval]

### Knee Flexion 5th Percentile Values (KGs)

Age	L		R	
	Men	Women	Men	Women
20	14.6 [12.8,16.4]	10.8 [9.0,12.6]	15.1 [13.2,16.9]	11.3 [9.5,13.1]
25	13.4 [12.3,14.5]	9.6 [8.5,10.8]	13.9 [12.8,14.9]	10.1 [9.0,11.2]
30	12.7 [11.8,13.6]	8.9 [7.8,10.0]	13.1 [12.2,14.0]	9.4 [8.4,10.4]
35	12.1 [11.2,13.1]	8.4 [7.3,9.5]	12.6 [11.7,13.5]	8.8 [7.8,9.9]
40	11.7 [10.7,12.6]	7.9 [6.8,9.0]	12.1 [11.2,13.1]	8.4 [7.3,9.4]
45	11.2 [10.2,12.2]	7.5 [6.4,8.5]	11.7 [10.7,12.6]	7.9 [6.9,8.9]
50	10.7 [9.8,11.7]	7.0 [6.0,7.9]	11.2 [10.2,12.2]	7.4 [6.5,8.4]
55	10.2 [9.2,11.2]	6.4 [5.5,7.3]	10.7 [9.7,11.7]	6.9 [6.0,7.8]
60	9.6 [8.5,10.7]	5.8 [4.9,6.7]	10.1 [8.9,11.2]	6.3 [5.4,7.2]
65	8.9 [7.6,10.3]	5.2 [4.1,6.2]	9.4 [8.0,10.8]	5.6 [4.5,6.7]
70	8.1 [6.4,9.9]	4.4 [2.9,5.8]	8.6 [6.8,10.4]	4.8 [3.3,6.3]

[95% Confidence Interval]

### Ankle Dorsiflexion 50th Percentile Values (KGs)

Age	L		R	
	Men	Women	Men	Women
20	29.0 [27.7, 30.3]	20.1 [18.8, 21.4]	29.7 [28.3, 31.0]	20.8 [19.5, 22.1]
25	29.4 [28.6, 30.1]	20.5 [19.8, 21.2]	30.0 [29.3, 30.8]	21.2 [20.4, 21.9]
30	29.4 [28.7, 30.0]	20.5 [19.8, 21.2]	30.0 [29.4, 30.7]	21.2 [20.5, 21.8]
35	29.1 [28.4, 29.8]	20.3 [19.6, 21.0]	29.8 [29.1, 30.5]	21.0 [20.3, 21.6]
40	28.8 [28.1, 29.5]	19.9 [19.2, 20.6]	29.4 [28.8, 30.1]	20.6 [19.9, 21.3]
45	28.3 [27.6, 29.0]	19.4 [18.8, 20.1]	29.0 [28.3, 29.6]	20.1 [19.5, 20.8]
50	27.7 [27.1, 28.4]	18.9 [18.2, 19.5]	28.4 [27.7, 29.0]	19.5 [18.9, 20.1]
55	27.0 [26.4, 27.7]	18.2 [17.6, 18.8]	27.7 [27.1, 28.4]	18.9 [18.2, 19.5]
60	26.3 [25.6, 27.0]	17.4 [16.8, 18.1]	27.0 [26.3, 27.7]	18.1 [17.4, 18.8]
65	25.5 [24.7, 26.3]	16.6 [15.8, 17.4]	26.1 [25.3, 26.9]	17.3 [16.5, 18.1]
70	24.6 [23.6, 25.6]	15.7 [14.7, 16.7]	25.2 [24.3, 26.2]	16.4 [15.4, 17.4]

[95% Confidence Interval]

### Ankle Dorsiflexion 10th Percentile Values (KGs)

Age	L		R	
	Men	Women	Men	Women
20	21.0 [19.9,22.2]	15.0 [13.8,16.2]	22.1 [20.9,23.3]	16.0 [14.7,17.3]
25	21.2 [20.2,22.2]	15.2 [14.2,16.2]	22.3 [21.2,23.3]	16.2 [15.1,17.3]
30	21.4 [20.5,22.3]	15.3 [14.4,16.2]	22.4 [21.5,23.3]	16.3 [15.4,17.3]
35	21.4 [20.6,22.3]	15.4 [14.5,16.2]	22.5 [21.6,23.3]	16.4 [15.5,17.3]
40	21.4 [20.5,22.2]	15.3 [14.4,16.1]	22.4 [21.5,23.3]	16.3 [15.4,17.2]
45	21.1 [20.2,22.0]	15.0 [14.2,15.9]	22.2 [21.3,23.0]	16.1 [15.2,17.0]
50	20.7 [19.7,21.6]	14.6 [13.7,15.5]	21.7 [20.8,22.6]	15.6 [14.7,16.6]
55	20.0 [19.0,21.0]	13.9 [13.0,14.8]	21.0 [20.1,21.9]	15.0 [14.1,15.9]
60	19.0 [18.0,20.1]	13.0 [12.0,13.9]	20.1 [19.1,21.0]	14.0 [13.1,14.9]
65	17.8 [16.6,19.0]	11.7 [10.6,12.8]	18.8 [17.7,19.9]	12.7 [11.7,13.7]
70	16.2 [14.6,17.8]	10.1 [8.6,11.5]	17.2 [15.7,18.7]	11.1 [9.7,12.5]

[95% Confidence Interval]

### Ankle Dorsiflexion 5th Percentile Values (KGs)

Age	L		R	
	Men	Women	Men	Women
20	19.0 [17.2,20.7]	14.0 [12.2,15.7]	20.2 [18.5,22.0]	15.3 [13.3,17.2]
25	19.0 [17.5,20.5]	14.0 [12.5,15.5]	20.3 [18.8,21.8]	15.3 [13.6,17.0]
30	19.0 [17.7,20.3]	14.0 [12.7,15.3]	20.3 [19.0,21.6]	15.3 [13.8,16.8]
35	18.9 [17.7,20.2]	14.0 [12.8,15.2]	20.2 [19.0,21.5]	15.3 [13.9,16.6]
40	18.8 [17.5,20.1]	13.8 [12.6,15.0]	20.0 [18.8,21.3]	15.1 [13.7,16.4]
45	18.5 [17.1,19.8]	13.5 [12.2,14.7]	19.7 [18.4,21.0]	14.8 [13.4,16.1]
50	18.0 [16.6,19.5]	13.0 [11.8,14.3]	19.3 [18.0,20.6]	14.3 [13.0,15.7]
55	17.4 [15.9,18.9]	12.4 [11.1,13.7]	18.7 [17.4,20.0]	13.7 [12.4,15.0]
60	16.6 [15.0,18.2]	11.6 [10.3,13.0]	17.9 [16.6,19.2]	12.9 [11.6,14.2]
65	15.6 [13.8,17.4]	10.6 [9.0,12.2]	16.9 [15.3,18.4]	11.9 [10.4,13.4]
70	14.3 [12.0,16.6]	9.3 [7.2,11.5]	15.6 [13.5,17.7]	10.6 [8.6,12.7]

[95% Confidence Interval]