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Promoting academic and professional excellence in health care
to meet the challenges of aging in Sri Lanka

Practical guideline for physical fitness assessment for older adults

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PHYSICAL FITNESS ASSESSMENT IN OLDER ADULTS

1) The Sit and Reach Test:

The Sit and Reach Test is a common measure of **hamstring and lower back flexibility**, often performed using a flexibility box (sit-and-reach box).

- A **sit-and-reach box** (with a measuring scale)

4. Measurement:

The **distance reached** (in cm/inches) is recorded.

- **Zero point** = where the soles of your feet touch the box.
- **Score:**
 - + **(positive)**: If fingertips go beyond toes.
 - **(negative)**: If fingertips don't reach toes.

5. Perform **3 trials**, recording the **best score**.

- A flat, non-slip surface.

Step-by-Step Instructions:

1. Preparation:

- **Warm up** lightly (e.g., 5 min of walking + dynamic leg stretches).
- **Remove shoes** (test is done barefoot or in socks).
- Place the box against a wall or secure it to prevent slipping.

2. Starting Position:

- Sit on the floor with **legs fully extended**, feet flat against the box.
- Feet should be **hip-width apart** (~12 inches between heels).
- Knees must **stay straight** (no bending).

3. Performing the Test:

- Place **one hand on top of the other** (fingertips aligned).
- Inhale, then **exhale as you slowly reach forward** (no jerking!).
- **Slide hands along the measuring scale** as far as possible.
- **Hold the farthest position for 1–2 seconds** (no bouncing).

Common Mistakes to Avoid:

- ✗ **Bending knees** → Invalidates the test.
- ✗ **Reaching unevenly** (one hand farther than the other).
- ✗ **Holding breath** → Limits flexibility.

The American Council of Health recommends that stretching your hamstrings for 30 minutes a day three times a week will help to increase flexibility within a few months.

This sit-and-reach test is an excellent way to determine your overall levels of flexibility. If you find that you have scored extremely low, this is a good sign that you need to incorporate more flexibility training into your daily routine.

2.) MUSCULAR ENDURANCE:

Assessing the ability of a muscle or muscle group to sustain repeated contractions or maintain a static hold over time. The target regions for testing depend on fitness goals, sport-specific demands, or rehabilitation needs.

Upper body	Core body	Lower body
<p>Target Muscles: Pectorals, deltoids, triceps, and scapular stabilizers.</p> <p>Push-Up Test: <i>Maximal Reps:</i> Perform as many push-ups as possible in 60 sec (full-body or modified knee position). Norms vary by age/sex (e.g., males 18–25: 30–40 reps; females: 15–25 reps)</p>	<p>Target Muscles: Rectus abdominis, obliques, transverse abdominis, erector spinae, and multifidus.</p> <p>1.Plank Hold: Measures anterior core endurance. <i>Procedure:</i> Hold a forearm plank with elbows under shoulders and body in a straight line until form breaks (e.g., hips sag). Norms: College-aged males average ~124 sec; females ~83 sec .</p> <p>2.Curl-ups -Lie supine (on your back) with knees bent at 90°, feet flat. -Arms straight at your sides, palms down, fingertips resting on a piece of tape/markings (Baseline 1). -A second tape/markings (Baseline 2) is placed 10 cm (4 inches) beyond Baseline 1.</p> <ul style="list-style-type: none"> • Movement: -Slowly curl your torso up, sliding fingertips toward Baseline 2. -Shoulder blades must lift off the mat; lower back stays in contact. -Return to start (fingertips back to Baseline 1) = 1 rep. <p>-Pacing: Perform 20–25 reps per minute (metronome-guided or 1 rep every 2–3 sec).</p> <p>-Test Endpoint: ✓ Continue until exhaustion or form breaks (e.g., lower back lifts, momentum used).</p>	<p>Target Muscles: Quadriceps, hamstrings, glutes, and calves.</p> <p>Static Squat (Wall Sit): Hold a 90° knee flexion against a wall; time until failure.</p> <p>Calf Raise Test: Repetitions to fatigue (straight knee for gastrocnemius; bent knee for soleus). Norms: Young adults average 30–37 reps.</p>

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3.) Cardiovascular Endurance (BEEP TEST):

The Beep Test (also known as the 20m Multistage Fitness Test, Shuttle Run Test, or PACER Test) is a standardized aerobic fitness assessment to measure your cardiovascular endurance. You have to run back and forth between two points 20 meters apart in sync with audio beeps that progressively get faster.

2. Setup

1. Mark two parallel lines **20 meters apart** using cones or tape

3. Test Procedure

1. Starting Position:

- Stand behind one line, facing the other.
- Begin running when you hear the **triple beep** (start signal)

2. Running Protocol:

- Run to the opposite line, arriving **before or on the next beep**.
- Turn and run back, synchronizing with subsequent beeps.

Pacing:

- **Level 1:** Starts at **8.0–8.5 km/h** (slow jog).
- Each **new level** (every ~1 minute) increases speed by **0.5 km/h**

Rules:

- **Warning:** If you miss a beep (fail to reach the line), you get one warning.
- **Elimination:** Two consecutive missed beeps end the test.
- **Foot Placement:** One foot must touch or cross the line each turn.

4. Scoring

- Resting Heart rate
- Recovery heart rate
- Record the Level and the Shuttle completed (e.g., 10.3 = Level 10, 3rd shuttle)

How to Estimate VO₂ Max from the Beep Test

Use these **validated formulas** based on your **final level/shuttle**:

1. Standard Formula (Léger et al., 1988)

$$VO_2 \text{ max (mL/kg/min)} = 3.46 \times (\text{Level} + \text{Shuttle}) + 18.07$$

Example: If you reach **Level 7, Shuttle 3**:

$$VO_2 \text{ max} = 3.46 \times (7 + 3) + 18.07 = 52.7 \text{ mL/kg/min}$$

4.) Skinfold Thickness Measurement with Calipers

Skinfold testing estimates **body fat percentage** by measuring subcutaneous fat at specific sites using a **skinfold caliper** (e.g., Harpenden).

2. Key Measurement Sites (3–7 Sites)

Site	Location
Triceps	Midpoint between shoulder and elbow, vertical fold on the back of the arm.
Biceps	Front of arm at midpoint, vertical fold.
Subscapular	Diagonal fold 1–2 cm below the shoulder blade (45° angle).
Suprailiac	Diagonal fold above the hip bone (mid-axillary line).
Abdomen	Vertical fold 2–5 cm beside the navel.
Thigh	Midpoint between hip and knee, vertical fold on the front.
Chest (men only)	Diagonal fold halfway between armpit and nipple.

Note: Common protocols use **3-site (Jackson-Pollock)** or **7-site (Durnin-Womersley)** methods.

3. Measurement Protocol

1. **Preparation:**
 - Test on **dry, un-lotioned** skin.
 - Measure the **right side** of the body (unless injured).
 - Take measurements in **millimeters (mm)**.
2. **Technique:**

- **Pinch:** Use thumb/forefinger to lift skin + fat (avoid muscle).
- **Place caliper:** 1 cm below fingers, perpendicular to the fold.
- **Read:** Record after 2 seconds (average 2–3 trials per site).

3. **4. Calculating Body Fat %**

4. Use **population-specific equations** (e.g., Jackson-Pollock):

5.) Muscular Strength with a Hand-Grip Dynamometer (HHD)

The grip strength is best measured with a **handgrip dynamometer** . is a portable device that quantifies muscle strength in **Newtons (N)**, **kilograms (kg)**, or **pounds (lbs)** by measuring the force exerted against it.

Measurement Steps

1. **Zero the HHD** before testing.
2. **Command:** *"Squeeze as hard as possible for 3–5 seconds!"*
3. **Record peak force** (in **kg, lbs, or Newtons**).
4. **Repeat 3x per hand**, take the **highest value**.