

# PARAMEDIC PHYSICAL FITNESS ASSESSMENT PROTOCOLS

CritiCare EMS, Interlake-Eastern Regional Health Authority, Manitoba Emergency Services College,  
Prairie Mountain Health, Red River Primary Care Paramedic, Southern Health/Santé Sud, WFPS

The University of Manitoba, Recreation Services offers a chance for applicants to practice all assessments. Click [here](#) for more information.

## **PART 1: General Fitness Assessment**

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The goals of the general Fitness Assessment is to provide a simple, safe, and standardized approach to assessing the major components of fitness in apparently healthy individuals and to interpret these assessments based on norms and percentiles for Canadians 15 to 69 years of age.

The General Fitness Assessment tests are completed one right after the other but there is no time limit. Applicants are to achieve a minimum score of "good" on each fitness assessment test to earn a pass for this section.

### **HEART RATE, < 100/min**

The heart is a muscle like any other muscle in the body; to become stronger it must be exercised regularly. The resting heart rate reflects this strength. A stronger heart is able to pump more blood with each beat; therefore fewer beats will be required to get an adequate amount of blood (and thus oxygen) to the tissue. The lowering of your heart rate can result in significant saving of the heartbeats per day. Over a lifetime this will undoubtedly result in a great deal less "wear and tear" on this most vital organ. Improved efficiency of the heart is perhaps the most plausible explanation for a reduced incidence of circulatory disease in the active individual.

### **BLOOD PRESSURE, <150/100**

Blood pressure is the pressure of the blood against the walls of the arteries. The walls of the arteries are elastic and muscular. The arteries stretch and relax in response to the increases and decreases in blood pressure. Each time the heart contracts, blood flow and blood pressure in the arteries increase. This pressure when the heart contracts is known as systolic pressure. When the heart relaxes, blood flow and blood pressure in the arteries decrease. This pressure during relaxation is known as diastolic pressure. The more difficult it is for the blood to flow through the arteries, the higher the blood pressure.

### **BODY COMPOSITION (Weight and Height)**

Body Mass Index (BMI) is the relationship between a person's height and weight. A high BMI score may be the result of excessive fat or from a high degree of muscularity. If an applicant has a low percentage of body fat and high BMI score it is due to his muscularity.

### **AEROBIC FITNESS**

The most common method of expressing your cardiovascular endurance or maximal aerobic power is in terms of your maximal volume of oxygen consumption, VO<sub>2</sub> max. Simply stated, to perform aerobic or endurance activities, your muscles must have oxygen to burn the fuel required to make them work. This essential gas is carried into the lungs with each breath of air and transported in the blood to the working muscles where it is used to drive the muscles machine.

Aerobic fitness, then, is the combined efficiency of your lungs, heart, bloodstream, and local muscles in getting the oxygen to these muscles and using it to perform work. For this reason, cardiovascular endurance or aerobic fitness is the most important component of physical fitness. The higher your VO<sub>2</sub> max, the greater is your functional capacity. With a larger aerobic capacity, daily activities require less effort and leave a bigger reserve for pursuing recreational activities and dealing with emergencies should they arise.

The most suitable cardiovascular assessment will be chosen.

- **Single-Stage Treadmill Walking Test**

For this protocol, walking speed is individualized depending on the applicant's age, gender and fitness level. Walking pace is established during a 4-minute warm-up at 0% grade. After this, the applicant continues the brisk walking pace for an additional 4 minutes at 5% grade, continued by 2 minute cool down.

- **YMCA Bicycle Ergometer Submaximal Exercise Protocol / 12 min Bicycle Test**

This protocol uses three or four consecutive 3-min workloads on the bicycle ergometer. The pedal rate is 50 rpm. The workload increases after each stage.

The combination of the heart rate, workload, weight, gender and age are used to predict the maximal oxygen consumption (VO<sub>2</sub> max). The greater the exercise intensity and the lower the heart rate, the greater the VO<sub>2</sub> max. VO<sub>2</sub> max is recorded in litres per minute (l·min<sup>-1</sup>) as the absolute amount and relative to applicant's own body weight expressed in milliliters per kilogram of body weight per minute (ml kg<sup>-1</sup> min<sup>-1</sup>). The latter units are more commonly used so individuals of different sizes can be more fairly compared to each other.

## **MUSCULAR STRENGTH / MUSCULAR ENDURANCE**

Muscular strength is the ability of a muscle or muscle group to exert maximal force (contraction) in one all-out effort (eg. opening a tight jar). Muscular endurance is the ability of a muscle or muscle group to exert a submaximal force over a long period of time (eg. carrying a bag of groceries for five blocks). For both, the intensity of work is greater than that for aerobic endurance.

Although separately defined, muscular strength and endurance are closely interrelated and are on a continuum with strength at one end and muscular endurance at the opposite end. All activities lie along the continuum and therefore involve some combination of muscular endurance and muscular strength.

In order to increase your muscular strength and endurance, your muscles must be overloaded. This overload can come from your body weight, the use of weights or some type of resistance. The amount of the overload and the number of repetitions performed determine where along the continuum the activity falls.

- **Grip Strength:** Measure of forearm strength and may be related to total body strength.
- **Push-Ups:** Measure of upper body strength and endurance.
  - **Males:** The applicant lies on his stomach, legs together. His hands, pointing forward, are positioned under the shoulders. He then pushes up from the floor by fully extending the elbows and using toes as the pivot point. The applicant returns to the starting position. Neither the stomach nor thighs should touch the mat.
  - **Females:** Same as males except using the knees as the pivot point. The lower legs remain in contact with the floor, ankles plantar-flexed, and feet in contact with the floor. Incorrect repetitions will not be counted. The test is stopped when applicant are seen to strain forcibly or are unable to maintain correct technique over two consecutive repetitions. There is no time limit.
- **Partial Curl-Ups:** Measure of abdominal strength and endurance. Applicant lies in a supine position with the head resting on the mat, arms straight at sides and parallel to the trunk, palms of hands in contact with the mat, fingertips at the 0 mark. Knees are bent 90, keeping heels in contact with the mat and shoes on. Metronome is set at 50 beats/min. This is followed by curling up of the upper spine far enough so that the middle finger tips of both hands reach the 12cm mark (for 39 years and under) and 8 cm mark (for 40 years and over). On the return, the shoulder blades and head must contact the mat and the fingertips of both hands must touch the 0 mark. The test is stopped when the applicant's pace does not match the metronome, severe discomfort occurs, or when technique breaks down. Applicants are allowed a maximum of 3 corrections or 2 consecutive incorrect reps – then the test is stopped. The applicant performs as many consecutive curl-ups as possible, without pausing, to a maximum of 75.

- **Back Extension:** Back extension is measured using portable steps and a timer. The applicant lies face down on at the top of the steps with the iliac crest (pelvic region) positioned at the edge of the steps, while keeping the hips, shoulders and head aligned (keeping a straight back while contracting abdominal muscles). The applicant's lower body will be secured to the steps using supportive straps. The applicant raises the upper half of their torso and crosses their arms on their chest, then maintains the horizontal position for as long as possible without dropping or rotating the torso for a maximum of 180 seconds. If the applicant's torso drops or rotates, they will be given one warning and then the test will be stopped.

## **FLEXIBILITY**

The range of motion at each joint is a measure of the flexibility or suppleness of that joint. Movement at a joint site is limited by bone structure, elasticity of connective tissue and muscle tissue, and ligament support. Therefore, flexibility varies from joint to joint.

- **Lower Back Flexibility:** Sit and reach (trunk flexion), measure of hips and back of thighs (hamstrings) flexibility. Sitting in front of a flexometer with knees fully extended. Lean forward and reach hands as far past the feet as possible. Assesses lower back and hamstring flexibility.

## **PART 2: Job-Related Tests**

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The Job Related tests are completed immediately following the General Fitness Assessment tests, one right after the other but there is no time limit. They all are either pass or fail. Applicants are to pass each job-related test to earn a pass for this section.

- **Equipment Carry:** Carry a trauma bag, O2 tank, and defibrillator up and down one flight of stairs without stopping.
- **CPR Compressions:** Perform CPR compressions on a mannequin for 3 consecutive minutes.
- **Patient Carry Simulation:** Ascend and descend 4 stairs both forwards and backwards carrying 110 lb. (50 kg.) barbell.
- **Patient Transfer Simulation:** Transfer an 80 lb. sand bag from a cradle position from table height down to a height approximately 1 foot from the ground. After fully standing up, pick up the bag again, and then return it to the table. Distance between each transfer is approximately 15 feet.