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## Physical activity to prevent CVD across the lifespan: Local and global burden.

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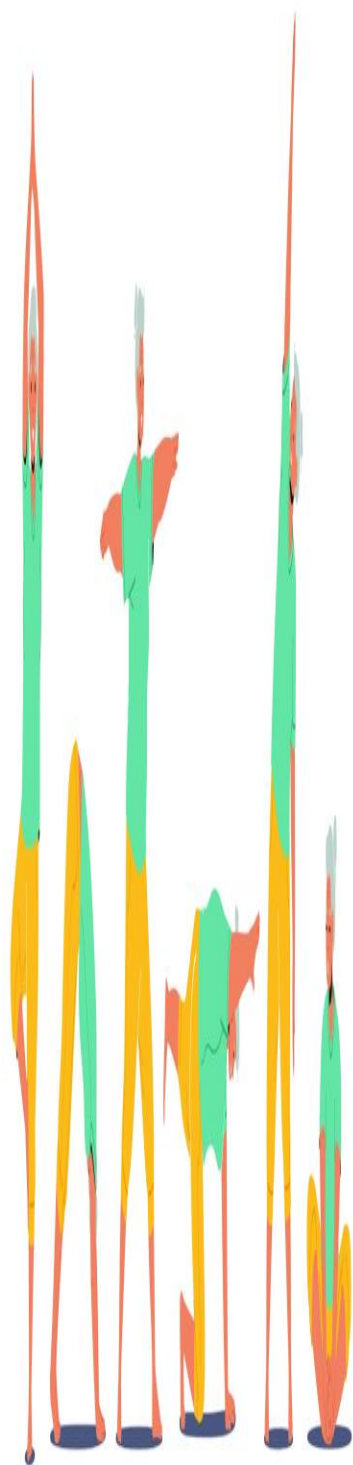
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# Ideal Exercise Prescription for Cardiovascular Health

August 10, 2022|[Elizabeth Moxley](#)

*Thank you to Elizabeth Moxley, PhD, RN, BS for this article on physical activity and exercise prescription.*



What is the ideal exercise prescription? It is well established that exercise improves cardiovascular and all-cause mortality, although an ideal exercise dose is unknown.<sup>1-2</sup> What is known, and perhaps most concerning, is that physical inactivity has increased<sup>3-4</sup> in recent decades to the extent that it affects all strata of society: every age, culture, race, gender, and ethnic background.<sup>5</sup>

Approximately 80% of U.S. adults and 81% of adolescents fail to meet physical activity requirements established by recent guidelines of a minimum of 150 to 300 minutes per week of moderate-intensity aerobic and muscle strengthening activity.<sup>6-7</sup> This lack of adequate physical activity was found to contribute to at least 8% of deaths in the United States, with a significant association between physical activity and mortality in adults aged 40 to 70. In other words, physically inactive adults between 40 to 70 years of age had a greater risk of premature death than those who maintained a quantity of physical activity consistent with the guidelines.<sup>8</sup>

Quantities of physical activity consistent with the guidelines, or the ‘sweet spot,’ are well-established for longevity and cardiovascular health.<sup>9</sup> Physical activity is a known primary modifiable risk factor for CVD<sup>10</sup> and a leading risk factor for mortality.<sup>11</sup> Engaging in adequate quantities of physical activity decreases the risk for CVD, type 2 diabetes, breast and colon cancer, bone and joint problems, and other comorbidities.<sup>12-13</sup> While a “too much exercise hypothesis”<sup>14</sup> recently emerged in which adverse cardiovascular outcomes result from exercise performed at too high an intensity or too great a volume,<sup>15</sup> the greater risk to the U.S. population is that of not enough exercise. Since most Americans engage in too little exercise,<sup>16</sup> the message that physical activity and exercise are essential for improving health and decreasing cardiovascular risk should always be a priority for clinicians and their patients.<sup>17</sup> The primary concern for most individuals is to determine safe and sustainable exercise levels that can feasibly be incorporated.<sup>2</sup>

## **Exercise and Physical Activity**

While many people thoroughly enjoy exercise or being physically active, exercise and physical activity are distinct. Physical activity is any bodily movement produced by skeletal muscles that requires energy expenditure, such as playing, working, doing chores, and participating in recreation.<sup>19</sup> By comparison, exercise is planned, structured, and repetitive bodily movement performed to improve or maintain one or more components of physical activity.<sup>18</sup>

While used interchangeably, physical inactivity and sedentary behavior are not the same. Physical inactivity refers to not participating in the recommended quantity of regular physical activity.<sup>20</sup> Sedentary behavior is a behavior characterized by a low level of energy expenditure (sitting, reclining, or lying down) or a low level of movement as measured by devices that assess movement or posture.<sup>6,21</sup>

## **Ideal Exercise Session: Where to Begin?**

A current priority for achieving cardiovascular fitness is finding a time-efficient amount of exercise. A variety of barriers, however, keep individuals from meeting these goals, including

limited access to a safe location for exercise,<sup>22</sup> age, chronic disease, or knowledge about starting an exercise routine.

Some individuals are deterred by the term ‘exercise’ itself. For some individuals, ‘exercise’ may bring to mind stressful situations such as group fitness classes, activities at an intensity for which they may be ill-prepared, a previous exercise experience that was unwelcoming, or locations where the equipment is unfamiliar. Replacing the word ‘exercise’ with ‘activity’ or ‘movement’ may help to overcome these potential barriers. The important thing is to have individuals increase their level of activity; recent findings have progressively demonstrated that when it comes to exercise, everything counts,<sup>23</sup> and that increasing intensity may more efficiently improve fitness.

## **Importance of Intensity in Exercise**

Intensity was observed as an essential component of fitness and a strong predictor of morbidity and mortality in the Studies Targeting Risk Reduction Interventions through Defined Exercise-Aerobic Training and/or Resistance Training (STRRIDE-AT/RT).<sup>24</sup> STRRIDE-AT/RT revealed vigorous-intensity exercise more efficiently improved fitness than moderate-intensity exercise. When exercise was performed at a fixed intensity and varied dose, a greater improvement in  $\text{VO}_2$  peak (peak oxygen uptake) was observed than when exercise was performed at a varied intensity and fixed total dose.<sup>24</sup>

The American Heart Association and the American College of Cardiology recommend less frequent exercise sessions (3-4 times per week) for longer durations (30-40 minutes).<sup>25</sup> According to the American College of Sports Medicine (ACSM)<sup>26</sup> however, a decreased trend has occurred in the guidelines for exercise intensity since 1975—a trend paralleling the progressive increase in sedentary behavior. The 1975 ACSM recommendations to improve exercise intensity were consistent with a maximal amount of oxygen consumed ( $\text{VO}_{2\text{max}}$ ) of 70%.<sup>26</sup> By 1978, these recommendations had decreased to 50%  $\text{VO}_{2\text{max}}$ ,<sup>27</sup> with a subsequent decrease to 40% to 50%  $\text{VO}_{2\text{max}}$  by 1990,<sup>28</sup> at which time moderate-intensity exercise was considered sufficient to improve fitness.<sup>29</sup> The current American College of Sports Medicine<sup>30</sup> recommendations for exercise are consistent with the United States Department of Health and Human Services Guidelines recommending at least moderate intensity exercise or 46-63%  $\text{VO}_{2\text{max}}$ .

## **Measuring Physical Activity Intensity**

Intensity is measured in either absolute or in relative terms.<sup>31,32</sup> Metabolic equivalents, or METs<sup>20</sup>, are a measure of absolute intensity and reflect energy expenditure during rest.<sup>20</sup> An activity requiring 10 METs is equivalent to 10 times the energy required at rest. The CDC<sup>33</sup> and the ACSM<sup>30</sup> provide useful information to determine intensity in their recent guidelines. For example, light intensity activity requires 1.6-2.9 METs and includes slow walking, washing dishes, or playing an instrument. Moderate intensity (between 3.0-5.9 METs) includes brisk walking at about 3 miles per hour, slower bike riding, or gardening. Vigorous activity of 6 or more METs includes race walking, aerobic dancing, hoeing a garden, or biking uphill. While it is

easy to carry on a conversation during moderate-intensity exercise, conversations become more difficult when exercising at a vigorous intensity.

## **Time Efficient Exercise Sessions at Various Durations and Intensities**

The benefits of workouts that last for a short duration of time – albeit not always at a vigorous intensity – have demonstrated favorable cardiovascular outcomes.<sup>9, 34-38</sup> According to Saint-Maurice<sup>34</sup>, who recently examined physical activity and the rate of mortality data for Americans, as little as 10 minutes per day of additional low- to moderate-intensity exercise is sufficient to prevent more than 111,000 premature deaths each year. Paluch et al.<sup>9</sup> recently demonstrated the optimal step count for longevity is 8,000-10,000/day for those less than 60 years of age. However, if the individual is 60 years or older, 6,000-8,000 steps/day is necessary.

Several recent studies have demonstrated improvement in fitness from workouts of vigorous intensity for less than a minute. In 2017, Allison et al.<sup>35</sup> found that sedentary women were able to increase fitness by approximately 12% in six weeks after completing three 20-second bouts of stair climbing with several minutes of rest between sessions. Jenkins et al.<sup>36</sup> demonstrated the benefit of the ‘exercise snack’ – a series of brief workouts performed throughout the day – to improve cardiometabolic health. College students who climbed three flights of stairs as fast as they could improved their fitness by about 5% in six weeks. Islam et al.<sup>37</sup> also recently demonstrated cardiometabolic health benefits from ‘exercise snack’ involving physical activity performed for 1 minute or less.

## **Clinical Takeaways for An Exercise Prescription**

- Finding an exercise prescription that fits an individual requires flexibility. Exercise sessions can be divided into:
  - several smaller sessions with higher and lower intensities<sup>39</sup> interspersed throughout the day, like one- or two-minute walks, short bursts of fast walking, climbing stairs, carrying shopping bags, gardening
  - long and continuous 30-minute sessions, as long as 150 minutes of moderate exercise are accumulated.<sup>40</sup>
- Replacing the word ‘exercise’ with ‘activity’ or ‘movement’ may help to overcome these potential barriers.
- Even weekend warriors or those who exercise only on weekends are less likely to die prematurely than those who rarely exercised at all.<sup>38</sup>

When it comes to the ideal exercise prescription, the perfect dose may be whatever best fits into the individual’s lifestyle to maintain a quantity of physical activity consistent with the recommended guidelines. And while increases in intensity improve cardiometabolic health and fitness,<sup>40</sup> any amount of exercise is better than nothing at all.<sup>2</sup>

### **Related Resources**

- [Behavior Change Mini-Certificate](#)
- Lifestyle and Behavior Change Tools: [Heart Healthy Toolbox](#)

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