Cardiorespiratory Fitness (CRF) Self-Check

HEALTH, BRAIN & COGNITION LAB
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Healthy Brains. Active Lives

01. Estimate Your CRF

This number represents your estimated cardiorespiratory fitness, or VO_2 max. It is the volume, or amount, of oxygen (in ml) per bodyweight {kg) that you could consume per minute, when you are working at your maximum level.

A CRF of around 30 ml/kg/min is what we and others see is typically associated with good brain outcomes in 50+ age groups. A CRF > 20 ml/kg/min has been associated with 1-2x lower risk of dementia in the next 10-20 years.

02.

This number represents how your estimated fitness level compares to people of your same biological sex and age group.

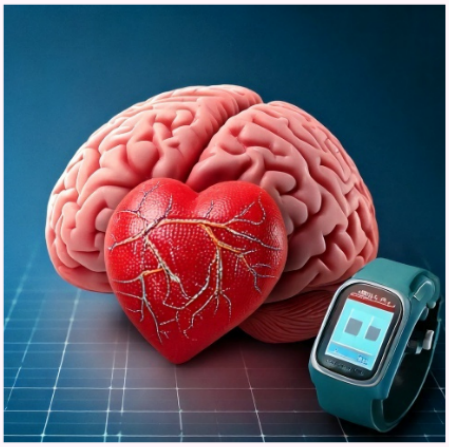
We see percentiles around average (50th percentile) and just above average associated with good brain outcomes in 50+ age groups.

03. How to improve your cardiorespiratory fitness

- ☐ Physical activity in the moderate intensity zone when you can walk and talk, but not sing
- ☐ Check your readiness for getting started
- ☐ Get to know your heart rate so your resting heart rate is accurate
- ☐ Every minute counts! Something is better than nothing, look for movement "snacks" in your day.
- ☐ Exercise soreness ok, pain not. Pain could be a sign that stability and strength are important for you first. Check our website blog for posts about local gyms that offer programs structured for middle-age and older-age adults.
- ☐ Join our HBC BOOST study (ages 40-65)
- ☐ Sign up for lab newsletter at our website to learn more

Physical activity readiness questionnaire

Cardiorespiratory fitness: What it is and why it matters



What is cardiorespiratory fitness and why should you care? One health marker that we and others have found tracks well with brain benefits of aerobic activity is cardiorespiratory fitness, or CRF.

Often measured as VO_2 max, CRF refers to the capacity for your heart and lungs to deliver oxygenated blood to your muscles for doing physical work.

How to find CRF estimate for most common smartwatches

Apple Watch

1. Open the **Fitness** or **Health** app on your iPhone.
2. Check Activity Rings for calories, steps, and exercise minutes.
3. For VO2 Max & Cardio Fitness, go to **Health App > Browse > Heart > Cardio Fitness**.

Garmin

1. Using **Garmin Connect App**.
2. Click "**More**" on bottom right. Select "**Performance Stats**" and then **VO2 Max**.
3. You will see a number that represents your VO2 max in ml/kg/min and a benchmark for your level relative to other people your age and sex.

Fitbit

1. Open the **Fitbit App** and tap your profile icon.
2. Select **heart rate icon** where your resting heart rate is shown
3. Look for your "**Cardio Fitness**" number at the top.

Indeed, VO_2 max refers to the maximum volume of oxygen you can convert to work when pushed as hard as you can in a controlled setting.

Expert Dr. Michael Joyner describes CRF as your "aerobic engine size." [1] In addition to brain health and dementia, a higher CRF also predicts risk of chronic health conditions and mortality. [2]

While the gold-standard for measuring CRF for people over 40 is a laboratory test supervised by a physician, we and others are developing tools to estimate CRF based on information you can provide at home.

One example tool can be accessed with the QR code on the reverse side of this sheet. The answer you receive will be a number in the units of ml/kg/min. You may have noticed that sex is a factor in the equation to determine CRF. This is because males have a greater blood volume and oxygen carrying capacity than females do. [3] The number calculated by the tool corresponds to your own "aerobic engine size." Another tool allows you to see how your CRF ranks compared to others your age and sex. [4] Below 50 for your percentile would indicate your CRF is below average.

Fortunately, even if your current CRF is below average, there is a way to improve it. Gradually increasing your weekly physical activity can boost your CRF, and in turn will help keep you, and your brain, healthy as you age.

REFERENCES

1. For a long and detailed discussion including an in-depth explanation of cardiorespiratory fitness, see this podcast discussion with Dr. Joyner: https://peterattiamd.com/mikejoyner/

2. For protective benefits of CRF, see Lee J. (2021). Influence of Cardiorespiratory Fitness on Risk of Dementia and Dementia Mortality: A Systematic Review and Meta-Analysis of Prospective Cohort Studies. Journal of aging and physical activity, 29(5), 878–885. https://doi.org/10.1123/japa.2019-0493

See also Lee, J., Song, R. J., Musa Yola, I., Shrout, T. A., Mitchell, G. F., Vasan, R. S., & Xanthakis, V. (2021). Association of Estimated Cardiorespiratory Fitness in Midlife With Cardiometabolic Outcomes and Mortality. JAMA network open, 4(10), e2131284. https://doi.org/10.1001/jamanetworkopen.2021.31284; and Tari, A. R., Nauman, J., Zisko, N., Skjellegrind, H. K., Bosnes, I., Bergh, S., Stensvold, D., Selbæk, G., & Wisløff, U. (2019). Temporal changes in cardiorespiratory fitness and risk of dementia incidence and mortality: a population-based prospective cohort study. The Lancet. Public health, 4(11), e565–e574. https://doi.org/10.1016/S2468-2667(19)30183-5

See also Health, Brain & Cognition Lab blog post, https://hbc.lab.uiowa.edu/news/2025/03/fuel-your-brain-fitness

3. Diaz-Canestro, C., Pentz, B., Sehgal, A., & Montero, D. (2022). Sex differences in cardiorespiratory fitness are explained by blood volume and oxygen carrying capacity. Cardiovascular research, 118(1), 334–343. https://doi.org/10.1093/cvr/cvab028

4. https://www.kumc.edu/research/alzheimers-disease-research-center