

DETERMINATION OF INTENSITY OF EXERCISE (BACKGROUND)

OHRP's "*Categories of Research That May Be Reviewed by the Institutional Review Board (IRB) through an Expedited Procedure*" lists under (4)(e) "moderate exercise, muscular strength testing, body composition testing, and flexibility testing where appropriate given the age, weight, and health of the individual." There is no further detail on how to determine what constitutes moderate exercise (versus vigorous exercise). This guidance aims to meet that need.

Procedure

The "Expedited or Full Board Review Determination Procedure" described above in this policy will be used to decide whether procedures involving exercise meet the definition above. However, for protocols falling into 'gray areas,' three sources of information will be used at the discretion of the subcommittee:

- IRB members or others with expertise in medicine and/or exercise science will be consulted.
- Subcommittee members will have investigators run them through exercise procedures.
- Subcommittee members will consult the guideline below from the Centers for Disease Control and Prevention and the American College of Sports Medicine (ACSM).
- The ACSM table** (p.7) will be considered definitive, if specified parameters are measured in a study of apparently healthy adults, as determined by, for example, the PAR-Q or PAR-Q+

ACSM/CDC Guidelines:

Moderate exercise consists of activities that result in a noticeable increase in breathing and heart rate, but can be comfortably sustained for ~45 minutes. The activities are commonly described as “very light” to “light” to “somewhat hard” when the level of perceived exertion is rated. During moderate intensity exercise, participants should be able to easily carry on a conversation.

Examples of common moderate intensity activities include:

- Walking at a moderate or brisk pace on a level surface
- Hiking
- Water aerobics
- Yoga
- Doubles tennis
- Raking the lawn
- Moderate household cleaning (e.g. vacuuming, washing windows, sweeping).

More than moderate exercise (vigorous) results in substantial increases in breathing and heart rate. The activities are commonly described as “hard” to “very hard” when the level of perceived exertion is rated. Carrying on a conversation is difficult during/while performing vigorous intensity exercise.

Examples of common more than moderate intensity activities include:

- Jogging or running
- Step aerobics
- Circuit weight training
- Most competitive sports (basketball, soccer, football, etc.)
- Singles tennis
- Heavy yard work (e.g. digging ditches, swinging an ax, pushing a mower).

Note: Moderate intensity activities may, in fact, be more than moderate if the participants are sedentary, not physically fit, elderly, and/or have a known cardiac, pulmonary, or metabolic disease.

Reference:

ACSM's Guidelines for Exercise Testing and Prescription (2010). Baltimore, MD: Lippincott, Williams, & Wilkins.

The IRB thanks Dr. Paul Loprinzi for his efforts in compiling this guidance. (Dr. Loprinzi is an Associate Professor of Health, Exercise Science and Recreation Management, and Director of the Exercise & Memory Laboratory in the School of Applied Sciences.)

Adapted from Table 5 (pg. 1341) of "Quantity and Quality of Exercise for Developing and Maintaining Cardiorespiratory, Musculoskeletal, and Neuromotor Fitness in Apparently Healthy Adults: Guidance for Prescribing Exercise," Position Stand, American College of Sports Medicine, MEDICINE & SCIENCE IN SPORTS & EXERCISE, Jul 2011; 43(7) pp. 1334-1359. DOI: 10.1249/MSS.0b013e318213febf. Copyright © 2011 by the American College of Sports Medicine.

Part 1. Cardiorespiratory Endurance Exercise: Relative Intensity.

Intensity	Relative Intensity			Perceived Exertion (Rating on 6-20 RPE Scale)
	%HRR or %VO ₂ R	%HR _{max}	%VO _{2max}	
Very light	< 30	< 57	< 37	< Very light (RPE < 9)
Light	30–39	57–63	37–45	Very light-fairly light (RPE 9–11)
Moderate	40–59	64–76	46–63	Fairly light to somewhat hard (RPE 12–13)
Vigorous	60–89	77–95	64–90	Somewhat hard to very hard (RPE 14–17)
Near-maximal	≥ 90	≥ 96	≥ 91	Very hard (RPE ≥ 18)

HR_{max} = maximal HR (heart rate). %HR_{max} = percent of maximal HR. HRR = HR reserve.

VO_{2max} = maximal oxygen uptake. %VO_{2max} = percent of maximal oxygen uptake. VO₂R = oxygen uptake reserve. RPE = ratings of perceived exertion (48).

Part 2. Cardiorespiratory Endurance Exercise: Intensity Relative to METs.

Intensity	Intensity (%VO _{2max}) Relative to Maximal Exercise Capacity in METs		
	20 METs %VO _{2max}	10 METs %VO _{2max}	5 METs %VO _{2max}
Very light	< 34	< 37	< 44
Light	34–42	37–45	44–51
Moderate	43–61	46–63	52–67
Vigorous	62–90	64–90	68–91
Near-maximal	≥ 91	≥ 91	≥ 92

From Table 4, pg. 1337: MET = ratio of the rate of energy expended during an activity to the rate of energy expended at rest...[One] MET is the rate of energy expenditure while sitting at rest. *NOTE: 10 METs = %VO_{2max} identical to Part 1 %VO_{2max} above.*

Part 3: Cardiorespiratory Endurance Exercise: Absolute Intensity.

Intensity	Absolute Intensity METs	Absolute Intensity (MET) by Age		
		Young (28–39 yr)	Middle Aged (40–64 yr)	Older (≥ 65 yr)
Very light	< 2	< 2.4	< 2.0	< 1.6
Light	2.0–2.9	2.4–4.7	2.0–3.9	1.6–3.1
Moderate	3.0–5.9	4.8–7.1	4.0–5.9	3.2–4.7
Vigorous	6.0–8.7	7.2–10.1	6.0–8.4	4.8–6.7
Near-maximal	≥ 8.8	≥ 10.2	≥ 8.5	≥ 6.8

From Table 4, pg. 1337: MET = ratio of the rate of energy expended during an activity to the rate of energy expended at rest...[One] MET is the rate of energy expenditure while sitting at rest.

Part 4: Resistance Exercise

Relative Intensity	
Intensity	% 1RM
Very light	< 30
Light	30–49
Moderate	50–69
Vigorous	70–84
Near-maximal	≥ 85

1RM: 1-repetition maximum (max amount a person can lift in one repetition, usually computed using a submaximal (formula) method).