

Energy Costs of Domestic Physical Activities

Advising Domestic Activities for Adults

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Diverse forms of physical activity has been shown to improve health outcomes and reduce risk for chronic disease. One means of prescribing exercise is by recommending specific physical activities by their frequency, duration, and relative intensity.

Domestic Circuit Training: One method of increasing weekly physical activity energy expenditure is by systematically combining a number of activities or domestic chores all in one defined period of time or “circuit”. This method couples two or more activities spaced with 1-2 minute rest-break periods. The duration each activity or chore depends on the time requirement of the chore/activity but is generally between 5-15 minutes. In the beginning two or three activities will be sufficient however as the participant’s stamina and fitness improve each circuit station may include 6-10 activities. The total time duration of the entire circuit of activities should be between 20 - 90 minutes depending on the health and fitness of the participant. The total energy expenditure (kcal) will be dependent on the total duration, average intensity or work load of the circuit activity and the body mass of the participant. The obvious benefit of this method of exercise is that one accomplishes necessary domestic tasks along with a significant increase in caloric expenditure which can help reduce cardiometabolic risk and contribute to weight loss. Note that for weight control purposes adding at least 1500 kcal per week is generally required for significant body weight loss for most overweight individuals but numerous factors determine exercise-generated weight loss (La Forge 2007).

Patient Domestic Circuit Training Counseling: It will be necessary to perform a domestic physical activity history on the patient before assigning specific household or yardwork chores to the circuit. Always start and end the circuit with activity that requires a low-level physical effort, e.g. easy stretching or several restorative yoga poses (e.g. modified cobra, legs-up-the wall pose and partial bridge pose) and then add activities in an order that requires increasing effort. The *Household Circuit Form* on the last page of this document is an example of a simple single page form with which activity instructions can be described and conveyed to the patient. Activity assignments can be inserted into the rectangular boxes on this form beginning with the box space at the top of the form (12 O’clock position) and then progressing through the circuit in a clockwise fashion. Note that the activities that can be inserted in each of the boxes can be culturally specific physical activities e.g., Native American domestic and spiritual dance choreographed movements.

Activity Classifications: As a guide, health care professionals can refer to the attached compendium of physical activities which was developed by Barbara Ainsworth, PhD and colleagues at the University of South Carolina and Stanford University to facilitate research but also to help classify and recommend physical activities for clinical purposes (Ainsworth 2000)*.

All activities are assigned an intensity level based on the rate of energy expenditure expressed as MET's. A MET is a multiple of resting energy expenditure. For example, 3 MET's requires three times the energy expenditure of the resting metabolic rate. Intensity of activities in the compendium is classified as multiples of 1 MET or as the ratio of the associated metabolic rate for the specific activity divided by a standard RMR. For weight-bearing activities, e.g. walking, running, the energy cost of activity is somewhat higher for heavier individuals than indicated by the MET intensities stated here. For these individuals use of MET costs will underestimate the energy cost of weight-bearing activity. For higher health risk patients (obesity, diabetes, metabolic syndrome, hypertension, etc.) domestic activities requiring 2-5 MET's are most appropriate. In time, activities in the 6-7 MET range may be appropriate depending on response to lower energy cost activities.

Helpful MET comparisons:

1 MET = 1 kcal per kg of body weight per hour

1 MET = ~1.2 kcal/minute for a 70 kg person

Note: It is not the intent of this Ainsworth's compendium of activities to be directly inserted into the domestic circuit activity form or to be given to your patient. It is intended to give you an idea of comparative energy expenditures of a large variety of physical activities. Many domestic activities that are relevant to your patient's lifestyle will not be in this compendium but there may be similar activities in the compendium that give you a sense of the relative energy cost.

* The attached Compendium of Physical Activities approximates energy expenditures only and does not take into account individual differences in movement patterns that may alter the energy cost of the activity.

Example Ainsworth database for walking (2000):

1993		2000		heading	description
compcode	METS	compcode	METS		
		21040	2.0	volunteer activities	walking, less than 2.0 mph, very slow
		21045	3.3	volunteer activities	walking, 3.0 mph, moderate speed, not carrying anything
		21050	3.8	volunteer activities	walking, 3.5 mph, brisk speed, not carrying anything
		21055	3.0	volunteer activities	walking, 2.5 mph slowly and carrying objects less than 25 pounds
		21060	4.0	volunteer activities	walking, 3.0 mph moderately and carrying objects less than 25 pounds, pushing something
		21065	4.5	volunteer activities	walking, 3.5 mph, briskly and carrying objects less than 25 pounds
		21070	3.0	volunteer activities	walk/stand combination, for volunteer purposes

Footnote: METS for certain golfing activities were revised downward from 1993 estimates based on measurement of the activity using indirect calorimetry.

References:

Ainsworth BE et. al., *Medicine & Science in Sports and Exercise*. 2000;Vol. 32, Suppl. pp. S498-S516.

La Forge R. What Health Care Professionals Need to Know about Physical Activity and Weight Loss Expectations: Key considerations for metabolic syndrome and diabetes prevention programs. *Lipid Spin* 2007;Vol. 5:10-16.

Name
Date
Rx:

Household Circuit Rx

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- 2-minute rest/water break between stations
- Always start and end session with warm-up/cool down exercise as prescribed
- Do not continue exercise or go the next station if you experience chest discomfort, palpitations, dizziness or unusual fatigue

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