

## THE PHYSICAL ACTIVITY GUIDELINES FOR AMERICANS: RATIONALE FOR REGULAR REVIEW AND UPDATES

In a landmark achievement, the United States Department of Health and Human Services published the first ever Physical Activity Guidelines for Americans in 2008. This science-based guidance helps guide Americans aged 6 and older in efforts to improve and maintain their health and avoid disease through appropriate and regular physical activity and serves as the foundation for federal, state, and local physical activity policy. The Guidelines also help physicians provide advice to their patients and help people learn the health benefits of physical activity, the amount of exercise to do each day to improve or maintain health and how to be physically active, while reducing the risks of injury. Unlike the Dietary Guidelines for Americans that are evaluated every five years for an update, the Physical Activity Guidelines have no such mandate from Congress.



Since the U.S. population is becoming more sedentary, diabetes rates are continuing to climb, and obesity remains an epidemic, it is more important than ever that we continue to actively promote regular physical activity to the U.S. population through whatever means are available. As part of this effort, we are in need of a regularly-updated set of Physical Activity Guidelines to guide our efforts and reduce

sedentary behavior through a regular review of the latest science. The update process for federal dietary and physical activity guidelines has a financial cost of about \$1 million, so the Department of Health and Human Services is hesitant to support this effort without a strong rationale to do so. Thus, it is important that we provide this rationale. Authorities believe that such a review should occur every five years as is done with the Dietary Guidelines, in order to determine if there is enough emerging science for interim guidance and should be mandatory every ten years for a comprehensive update.



### Some topics for review and potential inclusion in the next iteration of the Physical Activity Guidelines for Americans update:

- *Assessment of Physical Activity and/or Exercise Capacity in Clinical Practice as a Potential Vital Sign*<sup>1,2</sup>
- *The Impact of the Type of Exercise and Intensity on Diabetes and Metabolic Syndrome*<sup>3,4,5,6,7</sup>
- *Sedentary Behavior and its Impact on Health*<sup>8,9,10,11,12,13,14</sup>
- *Physical Activity and its Relation to Body Weight*<sup>15,16,17,18,19</sup>

- **Physical Activity Guidelines for Young Children (Ages 2-5)**<sup>20,21,22</sup>
- **Measuring Physical Activity Levels in the Population/Effective Surveillance**<sup>23</sup>
- **Differences in Exercise Response Between Men and Women**<sup>24, 25</sup>
- **Genetic Influence on Exercise Response**<sup>26</sup>

## References:

- 
- <sup>1</sup> Arena R, Myers J, Guazzi M. The clinical significance of aerobic exercise testing and prescription: from apparently healthy to confirmed cardiovascular disease. *American Journal of Lifestyle Medicine* 2008; 2; 519 originally published online Sep 9, 2008.
- <sup>2</sup> Arena, R., Myers, J., Guazzi, M. The future of aerobic exercise testing in clinical practice: is it the ultimate vital sign? *Future Cardiol.* 6(3), 325–342, 2010.
- <sup>3</sup> Bajpeyi S, Tanner CJ, Slentz CA, Duscha BD, McCartney JS, Hickner RC, Kraus WE, Houmard JA. Effect of exercise intensity and volume on persistence of insulin sensitivity during training cessation. *J Appl Physiol* 106: 1079–1085, 2009.
- <sup>4</sup> Church TS, Blair SN, Cocroham S, Johannsen N, Johnson W, Kramer K, Mikus CR, Myers V, Nauta M, Rodarte RQ, Sparks L, Thompson A, and Earnest CP. Effects of aerobic and resistance training on hemoglobin A1c levels in patients with type 2 diabetes: a randomized controlled trial. *JAMA* 304: 2253-2262, 2010.
- <sup>5</sup> Johnson JL, Slentz CA, Houmard JA, Samsa GP, Duscha BD, Aiken LB, McCartney JS, Tanner CJ, Kraus WE. Exercise training amount and intensity effects on metabolic syndrome (from Studies of a targeted risk reduction intervention through defined exercise). *Am J Cardiol* 100:1759 –1766, 2007.
- <sup>6</sup> Slentz CA, Tanner, CJ, Bateman L, Durham MT, Huffman KM, Houmard JA, Kraus WE. Effects of Exercise Training Intensity on Pancreatic  $\beta$ -Cell Function. *Diabetes Care* 32:1807–1811, 2009.
- <sup>7</sup> Smith IJ, Huffman KM, Durham MT, Duscha BD, Kraus WE. Sex-specific alterations in mRNA level of key lipid metabolism enzymes in skeletal muscle of overweight and obese subjects following endurance exercise. *Physiol Genomics* 36: 149–157, 2009.
- <sup>8</sup> Grøntved A and Hu F B. Television viewing and risk of type 2 diabetes, cardiovascular disease, and all-cause mortality. A meta-analysis. *JAMA* 305: 2448-55, 2011.
- <sup>9</sup> Huffman KM, Shah SH, Stevens RD, Bain JR, Muehlbauer M, Slentz CA, Tanner CJ, Kuchibhatla M, Houmard JA, Newgard CB, Kraus WE. Relationships Between Circulating Metabolic Intermediates and Insulin Action in Overweight to Obese, Inactive Men and Women. *Diabetes Care* 32:1678–1683, 2009.
- <sup>10</sup> Katzmarzyk PT, Church TS, Craig CL, and Bouchard C. Sitting time and mortality from all causes, cardiovascular disease, and cancer. *Med Sci Sports Exerc* 41: 998-1005, 2009.
- <sup>11</sup> Patel AV, Bernstein L, Deka A, Feigelson HS, Campbell PT, Gapstur SM, Colditz GA, and Thun MJ. Leisure time spent sitting in relation to total mortality in a prospective cohort of US adults. *Am J Epidemiol* 172: 419-429, 2010.
- <sup>12</sup> Sisson SB, Katzmarzyk PT, Earnest CP, Bouchard C, Blair SN, and Church TS. Volume of exercise and fitness nonresponse in sedentary, postmenopausal women. *Med Sci Sports Exerc* 41: 539-545, 2009.
- <sup>13</sup> Stamatakis E, Hamer M, and Dunstan DW. Screen-based entertainment time, all-cause mortality, and cardiovascular events: population-based study with ongoing mortality and hospital events follow-up. *J Am Coll Cardiol* 57: 292-299, 2011.
- <sup>14</sup> Thorp AA, Owen N, Neuhaus M, Dunstan DW. Sedentary behaviors and subsequent health outcomes in adults. A systematic review of longitudinal studies, 1996-2011. *Am J Prev Med* 2011;41(2):207–215.

- 
- <sup>15</sup> Hankinson AL, Daviglius ML, Bouchard C, Carnethon M, Lewis CE, Schreiner PJ, Liu K, and Sidney S. Maintaining a high physical activity level over 20 years and weight gain. *JAMA* 304: 2603-2610, 2010.
- <sup>16</sup> Durheim MT, Slentz CA, Bateman LA, Mabe SK, Kraus WE. Relationships between exercise-induced reductions in thigh intermuscular adipose tissue, changes in lipoprotein particle size, and visceral adiposity. *Am J Physiol Endocrinol Metab* 295: E407-E412, 2008.
- <sup>17</sup> Huffman KM, Slentz CA, Bales CW, Houmard JA, Kraus WE. Relationships between adipose tissue and cytokine responses to a randomized controlled exercise training intervention. *Elsevier Journal* 57:577-583, 2008.
- <sup>18</sup> Lee IM, Djousse L, Sesso HD, Wang L, and Buring JE. Physical activity and weight gain prevention. *JAMA* 303: 1173-1179, 2010.
- <sup>19</sup> Hollowell RP, Willis LH, Slentz CA, Topping JD, Bhakpar M, and Kraus WE. Effects of exercise training amount on physical activity energy expenditure. *Med Sci Sports Exerc* 41: 1640-1644, 2009.
- <sup>20</sup> Jones RA and Okely AD (2011) Physical activity recommendations for early childhood. In Tremblay RE, Barr RG, Peters RDeV and Boivin M (eds) *Encyclopedia on Early Childhood Development*. Montreal, Quebec: Centre of Excellence for Early Childhood Development.
- <sup>21</sup> . Department of Health and Ageing (2010) *National Physical Activity Guidelines for Australians. Physical Activity Recommendations for 0–5 year olds*. Canberra: Government of Australia.
- <sup>22</sup> National Association for Sport and Physical Education (2009) *Active Start: A statement of physical activity guidelines for children from birth to age 5*, second edition. Reston, VA: American Alliance for Health, Physical Education, Recreation, and Dance.
- <sup>23</sup> Trojano RP, Berrigan D, Dodd KW, Masse LC, Tilert T, and McDowell M. “Physical activity in the United States measured by accelerometer.” *Med Sci Sports Exerc* 40: 181-188, 2008.
- <sup>24</sup> Robbins JL, Duscha BD, Bensimhon DR, Wasserman K, Hansen JE, Houmard JA, Annex BH, Kraus WE. A sex-specific relationship between capillary density and anaerobic threshold. *J Appl Physiol* 106: 1181–1186, 2009.
- <sup>25</sup> Huffman KM, Slentz CA, Johnson JL, Samsa GP, Duscha BD, Tanner CJ, Annex BH , Houmard JA, Kraus WE. Impact of hormone replacement therapy on exercise training–induced improvements in insulin action in sedentary overweight adults. *Elsevier Journal* 57, 888-895, (2008).
- <sup>26</sup> Bouchard C, Sarzynski MA, Rice TK, Kraus WE, Church TS, Sung YJ, Rao DC, and Rankinen T. Genomic Predictors of Maximal Oxygen Uptake Response to Standardized Exercise Training Programs. *J Appl Physiol* 110: 1160-1170, 2011.