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The Role of Pre-Activity Participation Screening in Older Adults*

Selected Annotated Bibliography

for the
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&
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Assessing Existing Screening Guidelines for Physical Activity in the
Context of Ongoing Community-Based Physical Activity Interventions for Older Adults

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Summary of Reviewed Literature

Numerous studies have reported on the benefits of physical activity for adults of all ages. The Centers for Disease Control and Prevention recommends that most adults raise their activity levels with the goal of being active thirty minutes a day for most days of the week. Health care providers are in turn encouraged to counsel their patients to be more physically active. Whereas the initial emphasis was on vigorous activity, in recent years the value of moderate intensity activity has become increasingly recognized. Low to moderate intensity physical activity is generally considered safe for the majority of adults fifty and older, with the risks of being sedentary far outweighing risks associated with becoming more active.

Those wishing to participate in more vigorous activities or those with known health risks (e.g., existing cardiac disease) are typically encouraged to undergo screening before beginning a physical activity regimen. The screening can begin with a self-report tool, include clearance through medical histories and physical exams, and proceed to specialized exercise testing and laboratory work for those at highest risk.

The advantages and disadvantages of different screening approaches are presented in the literature with recommendations for screening guidelines and tools most applicable to different populations. Statistics about the adverse outcomes (e.g., cardiac events, death) reported from different exercise regimens are reviewed as are the benefits and contraindications of exercise testing and screening guidelines.

In addition to clinical outcomes, the potential legal issues and liability concerns of persons participating in exercise testing and recommended regimens must be considered. Important safety measures, including the need for physician supervision of high-risk patients and persons who should not undergo exercise testing, are also detailed in numerous articles. A new screening paradigm is introduced that highlights the need for tailoring activity programs to older adults' preferences and abilities through establishment of "customized physical activity plans".

This annotated bibliography report also contains a list of other selected references available and web-links relevant to the topic. These references were identified through a Medline search and augmented by referrals from experts in the field. The funding agency (Robert Wood Johnson Foundation) does not endorse any specific findings or conclusions indicated in this work.

Annotated Bibliography

Public Health Goals and Physical Activity Prevalence

Centers for Disease Control and Prevention, & Merck Institute of Aging & Health. (2004). *The state of aging and health in America 2004*, 21-26 Retrieved February 4, 2005, from http://www.cdc.gov/aging/pdf/State_of_Aging_and_Health_in_America_2004.pdf.

Summary: This report examines the known benefits of physical activity (PA), summarizes what is known about the prevalence of PA in older adults, and discusses strategies to increase that prevalence. Programs are featured which have successfully helped older adults increase their exercise. These are the "Lifetime Fitness Program," "PACE: People with Arthritis Can Exercise," and "Exercise: A Guide from the National Institute on Aging."

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Ham, S. A., Yore, M. M., Fulton, J. E., & Kohl, H. W., III. (2004). Prevalence of no leisure-time physical activity – 35 states and the District of Columbia, 1988-2002. *Morbidity and Mortality Weekly Report, 53(4)*, 82-86.

Summary: This report analyzes data from the Behavioral Risk Factor Surveillance System (BRFSS) from the years 1988 to 2002. It was found that from 1996 to 2002, the last year for which data was analyzed, the prevalence in adults of having no leisure-time physical activity declined at an overall average of one percent (1%) per year. When stratified by age group, the decline tended to be most pronounced in older adults, with men aged 50-59 exhibiting the most marked reduction of all age groups. Additionally, the reduction of prevalence of no leisure-time physical activity in women age 50 and older was consistently higher than in all younger adult women strata. Authors and editors cautioned that causes of this reduction were unknown, but that a new set of physical activity guidelines were issued in about 1996. Lastly, the authors admitted that although leisure-time physical inactivity is approaching the low of 20% prevalence desired by *Healthy People 2010*, the prevalence of obesity and overweight in the U.S. is not declining alongside it; this indicates that leisure-time physical activity may be insufficient to cause weight loss or curb weight gain.

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Macera, C. A., Jones, D. A., Yore, M. M., Ham, S. A., Kohl, H. W., Kimsey, C. D., Jr., et al. (2003). Prevalence of physical activity, including lifestyle activities among adults—United States, 2000-2001. *Morbidity and Mortality Weekly Report, 52(32)*, 764-769.

Summary: The Behavioral Risk Factor Surveillance System (BRFSS) is a population-based, random-digit telephone survey of persons 18+ in the U.S., Guam, Puerto Rico, and the U.S. Virgin Islands developed to assess physical activity. From 1986-2000, the BRFSS questionnaire included questions that measured leisure-time physical activity. A new set of BRFSS (2001 version) questions have been developed based on CDC and ACSM guidelines (30 minutes of moderate-intensity activity on most days of the week). The revised questions include more specific physical activity questions regarding health-related lifestyle activities. However, "the

findings indicate that even with a more complete measure of physical activity than used previously, the majority of U.S. adults are not physically active at levels that can promote health." In 2001, a total of 54.6% of persons were not active enough to meet these recommendations. The report also provides a state-by-state analysis of the respondents' physical activity levels for 2000 and 2001.

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National Blueprint. (2000). Increasing physical activity among adults age 50 and older. Retrieved on February 4, 2005, from http://www.agingblueprint.org/.

Summary: This booklet is the result of a cohesive effort by forty-eight organizations to help translate the evidence of the benefits of physical activity (PA) for older persons into national practice. The booklet seeks to summarize current PA trends among Americans 50 and older, to discuss barriers to engaging in PA, and to suggest environmental, institutional, and policy-oriented means by which these barriers may be overcome in accordance with *Healthy People 2010*. The Blueprint has generated 18 priority strategies for action, including a few that specifically focus on best practices for screening.

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U.S. Department of Health and Human Services. (2000). *Healthy People 2010: Understanding and improving health (2nd ed.).* Washington, DC: U.S. Government Printing Office. Also available electronically: Section 22-Physical Activity and Fitness at: http://www.health.gov/healthypeople/Document/tableofcontents.htm.

Summary: This provides overviews on the issues and trends surrounding physical activity and discusses disparities in physical activity among population groups, e.g., more women and minorities, more older than younger adults, and more low- than higher-income adults report no leisure time physical activity, and people with disabilities and certain health conditions are less likely to engage in moderate or vigorous physical activity. It also suggests opportunities to promote physical activity and fitness. The document states the HP 2010 Goal, "Improve health, fitness, and quality of life through daily physical activity," and fifteen Objectives for Physical Activity and Fitness.

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U.S. Department of Health and Human Services. (1996). *Physical activity and health: A report of the Surgeon General.* Atlanta, GA: Centers for Disease Control and Prevention (CDC), National Center for Chronic Disease Prevention and Health Promotion. Also available electronically at: http://www.cdc.gov/nccdphp/sgr/sgr.htm

Summary: The report brings together decades of research on physical activity and health. Its major findings include: (1) people who are usually inactive can improve their health and well-being by becoming even moderately active on a regular basis, (2) physical activity doesn't have to be strenuous to achieve health benefits, and (3) greater health benefits can be achieved by increasing the amount of physical activity. The report provides information on the health benefits

of regular physical activity, establishes inactivity as a major public health concern, defines and gives examples of physical activity, gives the status of the nation's level of physical activity, offers ideas for improvement, and gives special messages to special populations, including older adults, people with high blood pressure, people who are anxious/depressed/moody, people with arthritis, and people with disabilities.

Benefits of Physical Activity and Exercise Interventions

Agency for Healthcare Research and Quality and the Centers for Disease Control. (2002). *Physical activity and older Americans: Benefits and strategies.* Retrieved January 21, 2005, from http://www.ahrq.gov/ppip/activity.htm

Summary: This article describes the importance of physical activity, the prevalence and cost of inactivity, and the health benefits of regular activity. It also offers a section on strategies to promote physical activity in older adults, which provides information on barriers to physical activity, and health care providers' lack of time and/or expertise. The article concludes with suggestions for the individual (daily routine, consult clinician, goal setting), the clinician (assess, include patient goal-setting, written exercise prescriptions, individually tailored programs, and follow-up) and communities (campaigns, walking trails, access to places to be active).

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Bean, J. F., Vora, A., & Frontera, W. R. (2004). Benefits of exercise for community-dwelling older adults. *Archives of Physical Medical and Rehabilitation, 85(Suppl. 3)*, S31-S42.

Summary: This review article examines the benefits of different types exercise for specific older adult populations (e.g., community-dwelling versus healthy elderly, as well as by chronic condition/disease) with differing needs, current screening guidelines, and chronic disease prevalence. While the article was targeted to the field of rehabilitation, the definitions given for physical activity and physical fitness, as well as those differentiating improvements in impairments from those in function and in disabilities, are clear, easy to communicate to others, and appropriate for many aspects of health care for older adults. In regards to screening, the article finds it is "well accepted that all older adults, regardless of their underlying medical conditions, should receive a medical screening before they begin an exercise program." However, the authors also note that not only is the evidence regarding the risk of sudden cardiac death for older adults beginning an exercise program insufficient, but also that the benefits of exercise would in most cases outweigh and attenuate any risk that is found to exist. A relevant strength of this article lies in the specific and exhaustive list of what the medical screening should cover (i.e., purpose of the physical exam, the medical history, and additional diagnostic tests).

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Blair, S. N., LaMonte, M. J., & Nichaman, M. Z. (2004). The evolution of physical activity recommendations: How much is enough? *American Journal of Clinical Nutrition, 79(Suppl.),* 913S-920S.

Summary: This article chronicles the evolution of physical activity guidelines from the early 1970's through today. Both epidemiologic studies, which gave support to the premise that intensity/frequency of exercise inversely correlated with severity/frequency of disease and thus provided the reasoning behind creating physical activity recommendations, and randomized controlled exercise trials, which quantified "the frequency, intensity, and duration" needed to bring about positive health outcomes, are examined for their influences on current exercise recommendations. Among the recommendations reviewed are the Centers for Disease Control and Prevention/American College of Sports Medicine, the American Heart Association, and the Institute of Medicine (IOM) guidelines and recommendations. The authors found that the IOM recommendation is not the ideal one to promote for public health, and instead suggest that 30 minutes daily of moderate intensity exercise should provide measurable benefits across many health outcomes for most, particularly sedentary, adults. For those persons for whom 30 minutes of such physical activity cannot maintain a healthy weight, caloric restriction and additional exercise are recommended, while for those moderately active adults who are at a steady weight, longer duration of exercise is recommended to achieve additional positive health outcomes. This article mentions older adults, but does not speak to them directly.

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Kahn, E. B., Ramsey, L. T., Brownson, R. C., Heath, G. W., Howze, E. H., Powell, K. E., et al. (2002). The effectiveness of interventions to increase physical activity: A systematic review. *American Journal of Preventive Medicine, 22(4S),* 73-107.

Summary: This article provides a review of numerous interventions targeting physical activity through informational, behavioral and social, environmental, and policy approaches. There were three behavioral and social interventions that were effective: a school-based physical education program, a social support in community settings program, and a program based on individually adapted health behavior change (which was tailored to the individual's readiness for change, specific interests, and preferences, and taught specific behavioral skills that enabled participants to incorporate moderate intensity physical activity into daily routines). The results of 20 reports on the effectiveness of the individually adapted approach showed increases in time spent in physical activity, increase in VO_2 max, energy expenditure, attendance at exercise sessions, number of sessions completed, percentage of people starting exercise programs, and the frequency of physical activity. The evidence supports that an individually adapted health behavior change approach is effective in increasing physical activity.

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King, A. C., Rejeski, W. J., & Buchner, D. M. (1998). Physical activity interventions targeting older adults: A critical review and recommendations. *American Journal of Preventive Medicine, 15(4),* 316-333.

Summary: The purpose of this article is to provide a review of selected interventions found in the literature body that promote physical activity among older adults. Twenty-nine studies were identified and reviewed for strengths and weaknesses. Each of the studies was evaluated using the following criteria: effectiveness, maintenance, potential public health impact, effects on subgroups, replication, generalizability, cost-effectiveness, and implementation. The discussion

portion reveals recommendations for future research and practice. These recommendations include: 1) to continue to adapt and refine the current national physical activity recommendations to address specific issues for older adults; 2) to evaluate the generalizability of interventions in more diverse subgroups of older adults; 3) to develop evidence-based protocols to aid in placing older adults into the most appropriate physical activity interventions; and 4) to encourage promotion of physical activity among older adults.

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Mazzeo, R. S., Cavanagh, P., Evans, W. J., Flatarone, M., Hagberg, J., McAuley, E., et al. (1998). Exercise and physical activity for older adults. *Medicine& Science in Sports & Exercise, 30(6),* 992-1008.

Summary: "Participation in a regular exercise program is an effective intervention/modality to reduce/prevent a number of functional declines associated with aging." This article's primary focus is the benefits associated with physical activity in older adults. The article focuses on the following five topics: 1) cardiovascular responses to both acute and chronic exercises; 2) strength training, muscle mass, and bone density implications; 3) postural stability, flexibility, and prevention of falls; 4) the role of exercise on psychological function; and 5) exercise for the very old and frail. The section discussing exercise for the very old and frail provides evidence dispelling myths that this population is incapable of or unable to participate in exercise. Recent research indicates this population has the potential to receive numerous benefits (physiological, metabolic, psychological, functional, etc.) from physical activity and can do so in a safe manner. Frailty or age should not be considered a contraindication to exercise; however, accommodations and/or modifications or temporary avoidance of certain activities may be necessary for a variety of reasons. The article supports encouraging exercise among this population and provides suggestions of appropriate exercises or physical activities.

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Simonsick, E. M., Guralnik, J. M., Volpato, S., Balfour, J., & Fried, L. P. (2005). Just get out the door! Importance of walking outside the home for maintaining mobility: Findings from the women's health and aging study. *Journal of American Geriatrics Society, 53(2),* 198-203.

Summary: This study included 800 functionally limited women from the Women's Health and Aging Study (a longitudinal cohort study) and monitored their progress over the span of one year. The authors found that "even a small amount of regular walking can confer short-term protection from further mobility loss." Asking the question, "During the last week, about how many city blocks or their equivalent did you walk?", the authors found that only 28% walked eight or more blocks (termed "walkers" for the study analysis) at baseline. The study found that, when adjusted for age and baseline walking difficulty, walkers were about twice as likely as non-walkers to maintain walking ability; this was true across all baseline levels of walking difficulty. One of the most commented-on discoveries of this study was that less than a third of persons who could walk eight blocks or more actually did so, again pointing to the need to get older adults involved in routine light intensity exercise at a minimum.

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U.S. Department of Health and Human Services. (2002). *Physical activity fundamental to preventing disease.* Retrieved January 21, 2005, from http://aspe.hhs.gov/health/reports/physicalactivity/

Summary: The article contains recent data (much of it in table form) on deaths due to preventable chronic diseases, participation in physical activity, and economic consequences of inactivity. It also discusses the relationship between physical activity and good physical and mental health, the necessity of physical activity for the maintenance of energy and a healthy weight, the epidemic of overweight and obesity, and the risks of not maintaining a healthy weight, and includes a call to action.

Professional Standards, Guidelines, and Best Practices

American Academy of Family Physicians, American Academy of Pediatrics, American College of Sports Medicine, American Medical Society for Sports Medicine, American Orthopaedic Society for Sports Medicine, American Osteopathic Academy of Sports Medicine. (2005). *Preparticipation Physical Evaluation (3rd ed.).* Minneapolis, MN: McGraw-Hill.

Summary: This booklet is really geared towards young adult and collegiate athletes, and the different evaluative tools and measures that should be taken to certify their participation in sports. However, several points are made which are germane to the discussion of screening older individuals for exercise. The first (p. 1) is that the purpose of any pre-exercise evaluation is to "facilitate and encourage safe participation, not to exclude athletes from participation." The second (p. 3-4) is what the evaluation should accomplish: bringing to light potentially deadly, disabling, or injury/illness-predisposing medical or musculoskeletal conditions, addressing legal and organizational guidelines for participation, determining overall health status, serving as one entry point into the healthcare system, and providing "an opportunity for discussion on health and lifestyle topics." The last (chapter 7) discusses the idea of clearance, and, while focusing on young athletes, nonetheless brings to mind the idea that minimum standards could/should also be set for older adults and then tailored to the individuals' needs. Among the most pertinent questions asked in this section are those at the top of the second column of page 61: "Can the athlete [older adult] safely participate with treatment…? Can limited participation be allowed…? …in what activities can the athlete [older adult] safely participate?" Chapter 9 details steps that need to be taken to improve and regularize the process, and the authors conclude that a preparticipation screening is a best practice for creating safe participation in sports [physical activity].

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American College of Sports Medicine. (2000). *ACSM's guidelines for exercise testing and prescription (6th ed.).* Philadelphia: Lippincott Williams & Wilkins.

Summary: This book provides information about the following topics: benefits and risks associated with exercise, health screening and risk stratification, pre-test evaluation, physical fitness and clinical exercise testing, interpretation of test data, exercise prescriptions, and

exercise testing for special populations (e.g., children, elderly, and pregnant). The ACSM states that "virtually all sedentary individuals can begin a moderate exercise program safely." It also cautions that a "potentially negative impact on physical activity participation may arise from suggesting that exercise is dangerous, or insisting that all sedentary persons receive medical clearance prior to becoming more active." The ACSM's recommendations for medical examination and exercise testing prior to participation in physical activity for older adults address the following situations: 1) if older person wanting to begin moderate exercise is apparently healthy—testing is not necessary, and 2) if older person wanting to begin vigorous exercise is apparently healthy—yes, testing is recommended. Persons with known cardiac, pulmonary, or metabolic diseases or other factors which increase the risk of adverse effects should also undergo testing before beginning an exercise program.
Abstractor's note: These guidelines are widely cited, making this book a valuable resource.

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Balady, G. J., Chaitman, B., Driscoll, D., Foster, C., Froelicher, E., Gordon, N., et al. (1998). Recommendations for cardiovascular screening, staffing, and emergency policies at health/fitness facilities. *Medicine & Science in Sports & Exercise, 30(6),* 1009-1018.

Summary: The purpose of this article is to provide evidence for the need of cardiovascular screening for health and fitness facility members prior to beginning an exercise regimen. The article provides background information about the need for increased physical activity, the benefits of regular exercise, and the rationale for screening. The article recommends all exercise facilities conduct cardiovascular screening of all new or prospective members, regardless of the level or type of exercise to be performed. Simple screening questionnaires such as the PAR-Q can easily be administered upon enrollment in the facility and provide crucial evidence in detecting possible high-risk participants. High-risk participants should see their doctors before beginning the exercise program, and all members should be required to sign an assumption of risk or release/waiver form before being allowed to use the facilities. The results of the screening methods could be further used to develop an exercise prescription for the participant. Certified or training staff are needed to legally perform the screening and for development of the exercise prescriptions.

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Bryant, C. X., & Green, D. J. (Eds.). (2005). *Exercise for older adults: ACE'S guide for fitness professionals (2nd ed).* San Diego, CA: American Council on Exercise.

Summary: This book is a comprehensive guide aimed at preparing fitness professionals to care for and work with older adult populations. It includes seven chapters, each by one or more expert(s) in the field pertinent to the chapter. The book begins by covering the physiology of aging and the short- and long-term benefits of physical activity for the aging, then moves into means (e.g., the different psycho-social and behavioral models) by which fitness specialists can encourage older adult participants to participate in physical activity. Comorbidities—along with exercise guidelines, risk management strategies, and signs for which to be watchful for each disease—are covered, as is pre-activity screening and exercise strategies pertinent to older populations. The guide also speaks to strength training guidelines and program creation and

implementation. This is a thorough and useful guide that relies on individual expertise and review of pertinent literature to strengthen the opinions and claims presented therein.

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Centers for Disease Control and Prevention. (2003). *When is a medical evaluation necessary?* Retrieved January 21, 2005, from http://www.cdc.gov/nccdphp/dnpa/physical/starting/medical_evaluation.htm

Summary: The CDC Nutrition and Physical Activity web pages discuss the following topics: the importance of physical activity, recommendations, measuring physical activity intensity, making physical activity part of life, links for other physical activity sites, resources for health professionals, etc. The site also briefly discusses medical evaluations. According to the site, people with chronic diseases should talk with their doctors about the types and amounts of physical activities appropriate for them before beginning a new program.

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Cress, M. E., Buchner, D. M., Prohaska, T., Rimmer, J., Brown, M., Macera, C., et al. (2004). Physical activity programs and behavioral counseling in older adult populations. *Medicine & Science in Sports & Exercise, 36(11),* 1997-2003.

Summary: The authors formed an expert panel representing several organizations (among them the American College of Sports Medicine); their goal was to create a best practices statement that featured the following items: what should be included in a physical activity (PA) program for older adults, means by which older adults could be encouraged to change their sedentary or low physical activity lifestyles to become moderately active, and how to manage health risks and injuries both in general and specific to certain chronic illnesses. Among their recommendations regarding what to include in an older adult's PA regimen are activities that focus on endurance, strength, flexibility, and balance. Regarding what is necessary to help an older adult effect a behavior change, the panel advises that programs must incorporate the following principles of behavior change: social support, self-efficacy, active choices, health contracts, perceived safety, regular performance feedback, and positive reinforcement. Lastly, the paper addresses risk mitigation and prevention, stating that "while there are some risks associated with participation in regular physical activity, the risks associated with a sedentary lifestyle far exceed them." The authors argue that pre-exercise screening is an optional—but not mandatory—activity for most adults, although the caution is made that older adults do need to work out a "risk management and prevention strategy" before beginning a new program of PA.

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Fletcher, G. F., Balady, G. J., Amsterdam, E. A., Chaitman, B., Eckel, R., Fleg, J., et al. (2001). Exercise standards for testing and training: A statement for healthcare professionals from the American Heart Association. *Circulation, 104,* 1694-1740.

Summary: The main purpose of this article is to provide revised standards and guidelines for the exercise testing and training of individuals who are free from clinical manifestations of

cardiovascular disease and those with known cardiovascular disease. In relation to older adults, the article describes the special considerations to take into account when screening this population. Older adults, as well as all other patients entering an exercise program, should undergo a medical evaluation before initiating an exercise program. The evaluation should include an examination, paying special attention to possible physical or psychological limitations. For healthy older adults desiring to participate in a low-to-moderate intensity activity (e.g., walking), an exercise test may not be required. However, for more vigorous activity and for all cardiac patients, an exercise test should be performed. This statement presents guidelines that are a revision of the 1995 standards of the American Heart Association addressing exercise testing and training. This statement was approved by the American Heart Association Science Advisory and Coordinating Committee in June 2001.

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Fowler-Brown, A., Pignone, M., Pletcher, M., Tice, J. A., Sutton, S. F., & Lohr, K. N. (2004). Exercise tolerance testing to screen for coronary heart disease: A systematic review for the technical support for the U.S. Preventive Services Task Force. *Annals of Internal Medicine, 140(4),* W-9-W-25 (web only). Retrieved January 26, 2005, from www.annals.org.

Summary: This is the technical report on which the U.S. Preventive Services Task Force (USPSTF) depended to make their current cardiovascular pre-exercise screening recommendations. The review recalls the 1996 USPSTF recommendations, which stated that there was not enough conclusive evidence to recommend for or against using electrocardiography or exercise tolerance testing on middle-aged to older adults, and that these screening techniques should not be used on children, adolescents, and young adults. This paper then overviews the new evidence concerning only exercise tolerance testing (ETT), and purposes to compare ETT to the "standard history, physical examination, and measurement of traditional risk factors" in how well ETT screening could detect coronary heart disease (CHD) in asymptomatic individuals and provide "prognostic information about the risk for future coronary heart disease events." Through a review of literature garnered through a MEDLINE search, a scan of bibliographies of important papers, and expert suggestion, the authors found that "ETT of asymptomatic [adults] rarely detects previously unrecognized" CHD, that ETT can poorly predict whether an asymptomatic person will have a CHD event, and that the first and most important threat posed by ETT is the "potential for medical complications" from invasive procedures done to evaluate a false positive. In conclusion, the authors recommend against "routine" ETT in asymptomatic adults. While this paper has little to do with the older adults who are the concern of the screening roundtable, this article provides a valuable and thorough background on CHD pre-exercise screening.

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Kohl, H. W., Gibbons, L. W., Gordon, N. F., & Blair, S. N. (1990). An empirical evaluation of the ACSM guidelines for exercise testing. *Medicine & Science in Sports & Exercise, 22(4),* 533-539.

Summary: Recommendations for exercise testing are given in the ACSM guidelines for classifying patients into categories based on age, coronary heart disease risk factor status, symptoms, and presence of known disease. The purpose of this study is to report the authors' observations of the prevalence of abnormal exercise tests by age and health status, thus providing a basis to evaluate the appropriateness of previously determined testing guidelines. From the study, one of the conclusions drawn is that the presence of an abnormal exercise test may be a marker for the cardiac risks associated with exercise testing and subsequent exercise participation. This article supports exercise testing for some patients, particularly older patients who have preexisting coronary heart disease or risk factors for developing the disease. *Abstractor's note: It is important to note that this article was written in the early 1990s, when the assumption was that exercise referred to vigorous types of activities.*

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Leon, A. S., Franklin, B. A., Costa, F., Balady, G. J., Berra, K. A., Stewart, K. J., et al. (2005). Cardiac rehabilitation and secondary prevention of coronary heart disease: An American Heart Association scientific statement from the Council on Clinical Cardiology (Subcommittee on Exercise, Cardiac Rehabilitation, and Prevention) and the Council on Nutrition, Physical Activity, and Metabolism (Subcommittee on Physical Activity), in collaboration with the American Association of Cardiovascular and Pulmonary Rehabilitation. *Circulation, 111,* 369-376.

Summary: An update of "the American Heart Association (AHA) 1994 scientific statement on cardiac rehabilitation," this paper re-examines the benefits of physical activity for prevention of and rehabilitation after cardiac events. While regular physical activity has the potential to significantly lower the risk of coronary events, moderate intensity exercise of a volume great enough to improve aerobic capacity can not only rehabilitate a person who has suffered a cardiac event but also reduce the risk of future episodes. The authors of the statement note that regular exercise that improves aerobic capacity also improves fitness, that this can be done safely in the rehabilitative environment, and that this "improved fitness enhances a patient's quality of life and even can help older adults to live independently." It is noted that although many suffer from cardiac events, relatively few actually take advantage of the rehabilitative programs offered them; suggestions are made for future research that aim to increase the utilization of physical activity rehabilitation programs and to further evaluate the benefits of exercise therapy.

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National Council on Aging—Center for Healthy Aging. (Winter 2004). Designing safe and effective physical activity programs. *Issue Brief, 2,* 1-6. Retrieved February 21, 2005, from http://alpha.corporatezen.com:247/resources/IB_physicalactivity.pdf.

Summary: This is the second in a series of articles put forth by the National Council on the Aging (NCOA) to promote "best practices in physical activity programming for older adults." This issue explains that a "well-rounded physical activity program" for older adults must focus on the key components of endurance, strength, balance, and flexibility. It recommends working to adopt realistic goals, tailoring participants' activities to their needs, starting at low intensity

and building to moderate, and reviewing, revising, and re-tailoring programs throughout the course of the exercise program to keep pace with the adults' increased fitness. Behavioral change strategies are also discussed; these include engaging social support, involving the participant in decision-making, establishing health contracts, increasing perceived safety, and giving regular performance feedback and positive reinforcement. The brief also provides guidelines for injury and risk management, adding that "physical activity should be an integral part of daily life" and giving the goal of participating in 30 minutes a day (at no less than 10 minutes at a time) of moderate intensity activity five days per week. Lastly, this series installment offers concrete action steps to be taken by community physical activity programs.

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Paul-Labrador, M., Vongvanich, P., & Merz, C. N. B. (1999). Risk stratification for exercise training in cardiac patients: Do the proposed guidelines work? *Journal of Cardiopulmonary Rehabilitation, 19,* 118-125.

Summary: The American Association of Cardiovascular and Pulmonary Rehabilitation (AACVPR), the American College of Cardiology (ACC), the American College of Physicians (ACP), and the American Heart Association (AHA) have risk stratification guidelines for supervised exercise in patients with cardiovascular disease. The purpose of this article is to test the ability of the guidelines in predicting exercise complications. Of the 239 study participants, 12 experienced some type of complication during the supervised exercise session. None of the four guidelines was predictive of the complications. The findings of the study conclude that the current guidelines are not predictive of complications during supervised testing and should be further evaluated.

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U.S. Preventive Services Task Force. (2004). Screening for coronary heart disease: recommendation statement. *Annals of Internal Medicine, 140(7),* 569-572.

Summary: This is the highly-referenced summary of the USPSTF recommendations on cardiovascular pre-exercise screening, amended in 2004 from the 1996 guidelines. In the document, exercise treadmill testing (ETT), electrocardiography (ECG), and electron-beam computerized tomography (EBCT) scanning are "recommend[ed] against" for "adults at low risk [or asymptomatic] for CHD [coronary heart disease] events." This is because these methods are unlikely to result in "improved health outcomes" and because false positives on the tests could incur unnecessary and harmful procedures, resulting in more harm than good. For those adults at increased risk for CHD events, the USPSTF could neither recommend for nor against screening using the above methods, as the evidence is inconclusive.

Screening Tools and Exercise Testing

Cardinal, B. J., & Cardinal, M. K. (2000). Preparticipation physical activity screening within a racially diverse, older adult sample: Comparison of the original and revised physical activity readiness questionnaires. *Research Quarterly for Exercise and Sport, 71(3),* 302-307.

Summary: The article provides background information about the PAR-Q screening tool and its sensitivity and specificity. Two hundred participants were randomly selected from a volunteer list of four hundred older adults who had expressed interest in physical activity and nutrition topics. The participants completed both the original and the revised PAR-Q and the results were compared. Evidence in support of using the revised PAR-Q screening questionnaire instead of the original questionnaire in presented. The revised PAR-Q, when compared to the original one, reduced the number of people excluded from physical activity involvement by 13.5%. The original PAR-Q has a greater tendency to screen out older adults and discourage participation in physical activity. The revised PAR-Q questions are more relevant to exercise and physical activity. The questions include the words physical activity and do not merely ask questions related, in general, to heart problems. The questions, for example, ask about heart problems and pain while engaging in physical activity.
Abstractor's note: The revised PAR-Q is the questionnaire the Canadian Society for Exercise Physiology recommends using; it can be located at http://www.csep.ca/pdfs/par-q(2002).pdf

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Gibbons, L. W., Mitchell, T. D., & Gonzalez, V. (1994). The safety of exercise testing. *Primary Care, 21(3),* 611- 629.

Summary: This article, published in 1994, details the necessary steps to take to ensure the best possible safe procedures for exercise testing, at any age. The article has six purposes: 1) to review the published rates of complications associated with exercise testing in various populations around the world, 2) to outline the experiences with complications at the Cooper Clinic, 3) to review accepted standards for contraindications to testing and discuss the importance, 4) to review the recognized indications for terminating an exercise test and discuss the importance, 5) to discuss the safety of exercise testing soon after myocardial infarction or angioplasty, and 6) to outline recognized emergency procedures and safety equipment need for exercise testing facilities. The authors recommended taking the following precautions to make exercise testing safer: the individual conducting the test needs to be quite familiar with the patient and his/her history; a physician needs to be present during testing; and who to test and who not to test must be known. The article also lists some conclusions about the safety of testing (e.g., complications occur most often in recovery, thus patients need to be monitored for at least 10 minutes after the test and should remain in the clinic for about 1 hour for observation). A list of combinations of circumstances posing a higher risk is detailed (e.g., the combination of ST-segment depression and ventricular irritability is bothersome). The authors conclude that "it appears exercise testing is a safe, useful tool that is becoming even safer with time."

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Gill, T. M., DiPietro, L., & Krumholz, H. M. (2000). Role of exercise stress testing and safety monitoring for older persons starting an exercise program. *Journal of the American Medical Association, 284(3),* 342-349.

Summary: This article reviews research on the risks and benefits of physical activity (PA) and on current exercise stress testing guidelines as they apply to persons 75 years and older. Based on observational and randomized controlled trial evidence, the authors found that PA in adults

age 75 and older can reduce risks of a number of adverse events (e.g., falling, hospitalization for cardiovascular disease, loss of mobility) and increase muscle strength, balance, and active life expectancy in these populations. The authors then argued that ACSM and AHA guidelines for exercise stress testing were overly vague and not applicable to older populations. This was both because the definitions of exercise intensity used by both organizations rely on oxygen utilization measures that tend to be inaccurate and difficult to measure in older persons, and because older persons often have chronic diseases and asymptomatic cardiac abnormalities that can "diminish the diagnostic accuracy of treadmill exercise tests" or render older adults incapable of completing them. Furthermore, the high cost of fully testing older adults to rule out potential cardiac risk factors, and the complications that could arise through treatment of such risk factors once identified, may deter older adults from participating in PA, which the authors contended could "cause more harm than good." Instead, the authors recommended their own set of screening guidelines tailored to persons 75 and older.

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Ilia, R., & Gueron, M. (1997). Exercise stress testing in a community clinic: Experience with 38 970 patients. *Coronary Artery Disease, 8(11/12),* 703-704.

Summary: This article describes a study of 38,970 patients who participated in stress tests in community clinics from 1987-1996. The findings report no fatalities and only two myocardial infarctions during the recovery phase. The conclusion of the study indicates exercise testing can be performed safely in the community and need not always be performed in a hospital setting. Physicians who excluded patients in an unstable condition achieved a very low complication rate.

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Lear, S. A., Brozic, A., Myers, J. N., & Ignaszewski, A. (1999). Exercise stress testing: An overview of current guidelines. *Sports Medicine, 27(5),* 285-312.

Summary: This article provides a description of exercise testing, including necessary equipment and personnel, protocols, modalities, environment, procedures, etc. The potential hazards of exercise testing are also briefly described. The article maintains that exercise testing is "relatively safe, but potential hazards exist". The complication rate in men and women without diagnosed cardiovascular disease (CAD) is 0.8 per 10,000 tests. To reduce the occurrence of complications and provide optimal patient safety, standard exercise testing guidelines should be adhered to. Contraindications for exercise testing are also addressed in the article. They are divided into absolute (e.g., unstable angina, severe aortic stenosis, acute infections, acute congestive heart failure, recent complicated myocardial infarction, etc.) and relative (e.g., moderate valvular heart disease, ventricular aneurysm, chronic infectious disease, fixed-rate pacemaker, etc.) contraindications. With good clinical judgment, relative contraindications may be superseded if the benefits from the test are determined to outweigh the risks. The article does not provide specific information regarding exercise testing and older adults.

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Morrison, C. A. (2001). Using the exercise test to create the exercise prescription. *Primary Care, 28(1),* 137-58.

Summary: The primary purpose of this article is to address the role of the exercise test in the prescribing of appropriate activity levels, the writing of those prescriptions, and the importance of developing a plan for recommending specific exercise regimens to all patients. The majority of the article focuses on the development of the exercise prescription. The data reveals that the rate of physician counseling about exercise is low (29%-35%) and may represent important missed opportunities for primary prevention. The primary care provider should emphasize the importance of daily exercise and how it relates to health maintenance and disease prevention. Table 5 provides the ACSM recommendations for exercise testing and the need for physician supervision of the tests. In brief, Table 5 suggests that people who are low risk for cardiac events are not recommended for testing and can proceed with an exercise regimen. An increase in cardiac event risk leads to greater encouragement for exercise testing. The exercise test allows for use of objective data to generate a safe and effective level of exercise for healthy persons as well as those with disease. The article supports the continued supervision and evaluation by health care professionals of the safety and effectiveness of the exercise regimen.

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Rogers, M. E. (2005). Preexercise and health screening. In C. J. Jones, & D. J. Rose (Eds.) *Physical activity instruction of older adults* (pp. 57-80). Human Kinetics: Champaign, IL.

Summary: This chapter comes from one of the most recently published books designed to train physical activity instructors of older adults. In it, Rogers teaches readers why screening is useful and how to do it properly—from gaining consent to interpreting the results—and discusses when it is contraindicated. Relying on risk factor research and accepted guidelines to inform his instruction, this work features illustrated examples of useful screening tools and examines the range of screening modes available. Confidentiality of screening results and results-based physical activity program design and management are also discussed in this chapter.

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Suni, J. H., Miilunpalo, S. I., Asikainen, T. M., Laukkanen, R. T., Oja, P., Pasanen, M. E., et al. (1998). Safety and feasibility of a health-related fitness test battery for adults. *Physical Therapy, 78(2),* 134-148.

Summary: Health-related fitness (HRFI) assessment refers to those components of fitness that are related to health status. HFRI assessments may also be useful in promoting physical activity. The objectives of the study were to (1) evaluate the safety and feasibility of the Urbo Kaleva Kekkonen (UKK) Institute's HRFI test battery in an adult population, and (2) present a practical health screening procedure for non-physician fitness testing personnel to use for safe and effective application of HRFI testing. The HRFI assessment is used primarily for middle-aged, inactive adults. The study's results indicate that HRFI can be safely and effectively performed with minor physician participation for middle-aged adults. Additionally, a safety model for HRFI assessment conducted by non-physician testing personnel was developed based on the study's results. The model includes the following: (1) standard screening for health limitations, (2)

standard instructions to refer subjects with severe health limitations to a physician for further examination, and (3) standard instructions to exclude subjects with minor health limitations from selected fitness tests. In summary, "the proposed battery test offers a safe and feasible method for HRFI assessment of adult populations—with some reservations." This study also highlights the importance of standardized health screening procedure.

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White, R. D., & Evans, C. H. (2001). Performing the exercise test. *Primary Care, 28(1),* 29-53.

Summary: This article presents information describing current indications for performing exercise testing, contraindications to exercise testing, physician responsibilities during exercise testing, equipment for performing exercise testing, and hazards and complications of exercise testing. Much of the information was detailed and presented in table format. While this article does not provide evidence relating to the elderly population, it provides a useful overview of issues involved in exercise testing for adults.

Physician Recommendations

Brennan, F. H. (2002). Exercise prescriptions for active seniors: A team approach for maximizing adherence. *Physician and Sportsmedicine, 30(2)*, 19-26.

Summary: Brennan begins with a series of questions, including, "Does the patient need a cardiac stress test before starting the exercise prescription?" He then presents a case to show that healthcare providers can and should provide goal-oriented exercise prescriptions that are "realistic, individualized, [and] holistic" in practice. Such prescriptions, writes Brennan, must take into account the degenerative factors of normal aging, as well as any disease factors a patient may have, to fully enjoy all the benefits of exercise and prevent injury. Perhaps the most useful and relevant contribution of this paper to current thought is the algorithm presented in Figure 1—a decision tree covering everything from screening (e.g., for those who do not already exercise regularly but who are mentally and physically capable of an exercise regimen, review medical history of low cardiac risk patients and do more extensive cardiac evaluation for patients with high cardiac risk) to follow-up and encouragement. Brennan presents another decision tree for risk assessment, and provides a sample form that can be used to map out a program plan. Utilizing the acronym "MDFIT" (for mode of activity / duration of activity / frequency / intensity / timely follow-up), Brennan covers the essentials a provider must consider when helping patients formulate and adhere to an exercise plan or prescription. Other topics covered include tailoring exercise prescriptions for special patient populations and strategies for maximizing patient adherence.

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Christmas, C., & Andersen, R. A. (2000). Exercise and older patients: Guidelines for the clinician. *Journal of the American Geriatrics Society, 48,* 318-324.

Summary: This article provides a basic overview of the benefits of exercise for geriatric populations and presents guidelines for clinicians to help prescribe and facilitate adherence to an

exercise program. It contains information on 1) the different modes of exercise for older people; 2) the benefits of exercise for older people (detailing these topic areas: weight and body composition, falls/balance/activity level, strength/frailty/function, psychological health, arthritis pain, range of movement, flexibility, chronic illnesses, and longevity); 3) approaching and motivating sedentary older patients (outlining a systematic approach and a detailed exercise history); 4) writing an exercise prescription; 5) decreasing sedentary activities; and 6) issues important for follow-up.

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Franklin, B. A. (2004). Is preparticipation screening/exercise testing indicated in asymptomatic physically active adults? *American Journal of Medicine & Sports, 6(3),* 104-106.

Summary: This is an editorial piece aimed at examining the US Preventive Services Task Force stance, which states that using exercise testing as a screening method in asymptomatic, low-risk adults could neither be recommended for nor against based on available evidence. Because exercise tests can lack the ability to accurately differentiate those with the disease from those without it, and are highly expensive, the author suggests that mandating such testing for all asymptomatic persons would be impractical. The author contrasts American College of Sports Medicine screening guidelines with those of the American Heart Association and the American College of Cardiology, both of which consider exercise testing in asymptomatic individuals an action where the evaluation is considered either not useful and/or potentially harmful. It is also noted that exercise screening is considered potentially beneficial, although not well-evidenced, for those persons who have multiple coronary risk factors or for specific groups of asymptomatic individuals. In conclusion, the author proposes an alternative system of risk categorization for those without known cardiovascular disease to determine the necessity of screening on an individual basis.

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Haskell, W. L. (1994). The efficacy and safety of exercise programs in cardiac rehabilitation. *Medicine & Science in Sports & Exercise, 26(7),* 815-823.

Summary: Physical activity increases the demand on the heart and thus is potentially risky for coronary heart disease patients. Yet it is beneficial as an effective therapy that may reduce the future risk of cardiac events. As a result of the increased demand on the heart, caution is recommended for individuals participating in vigorous physical activity who also have cardiovascular disease. An appropriate program design, implementation, and monitoring of the patient generally results in a safe exercise experience. The authors recommend medical supervision during exercise testing be individualized to each person's needs. "Developing guidelines based on patient needs should lead to the more effective exercise training of a greater number of patients, a general reduction in costs for patients, increased safety for many patients now without adequate guidance and supervision, and a rational basis for the reimbursement for services provided."

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Morey, M. C., & Sullivan, R. J. (2003) Medical assessment for health advocacy and practical strategies for exercise initiation. *American Journal of Preventive Medicine, 25(3Sii),* 204-208.

Summary: The purpose of this article is to review the role of physicians in screening and advocating exercise, examine the risk of older adults and exercise, and investigate how epidemiologic studies of disability can be used for exercise therapy guidelines. The authors provide an overview of literature related to screening and initiating exercise. Many believe that the old adage of exercise being potentially harmful or fatal if one does not undergo a series of strict tests before beginning an exercise program may, in fact, deter people from engaging in an exercise program at all. Evidence indicates that adverse effects of exercise are rare. Screening recommendations are also largely based on expert opinion and often lack supporting evidence. The authors indicate that since "screening tactics promulgated by authorities lack evidence of value in preventing such (adverse) events, we should simplify expectations and eliminate most screening obligations." The authors, instead, recommend the "start low and go slow" method for beginning an exercise program. One of the future goals is for physicians to play a more active role in advocating exercise and not merely that of a gatekeeper.

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Nied, R. J., & Franklin, B. (2002). Promoting and prescribing exercise for the elderly. *American Family Physician, 65(3),* 419-426.

Summary: This article provides information about the benefits of exercise, screening, exercise prescriptions, promoting physical activity, and overcoming barriers to exercise. The recommendations in this article are consistent with those of the American College of Sports Medicine. The section on screening is brief, but provides important information. The article indicates that most older adults should undergo a history and physical examination directed at identifying cardiac risk factors, external signs and symptoms, and physical limitations. Few contraindications (e.g., unstable angina, uncontrolled hypertension, acute congestive heart failure, etc.) to aerobic exercise or resistance training exist, and patients with these conditions can safely exercise at low intensity levels after evaluation and necessary treatment. Exercise stress testing is recommended for all sedentary or minimally active older adults wanting to begin vigorous exercising. However, most older adults can begin a moderate exercise program without stress testing if they begin slowly and gradually increase their level of activity.

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Shepard, R. J. (2000). Does insistence on medical clearance inhibit adoption of physical activity in the elderly? *Journal of Aging and Physical Activity, 8,* 301-311.

Summary: The objectives of this article are to explore the need for medical clearance preliminary to an increase in physical activity in older persons and to consider whether or not medical clearance acts as a barrier to initiating physical activity. Encouraging older persons to engage in physical activity generally does not result in severe adverse outcomes. Seniors tend to be a more cautious group and will approach physical activities in a careful manner and take extra precautions to insure personal safety. Seniors who wish to participate in more vigorous physical activities are encouraged to visit with their physicians and rule out any conditions that may

worsen with certain types of exercise. However, for the senior who wishes to engage in walking, gentle gardening, or golf, the need for exercise testing or screening may deter him or her from participating in the activity. Physical activity has been shown to produce numerous benefits in older adults and should be recommended, not discouraged, by unnecessary testing.

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Singh, M. A. F. (2002). Exercise comes of age: Rationale and recommendations for a geriatric exercise prescription. *Journal of Gerontology, 57A(5),* M262-M282.

Summary: The article provides background information regarding exercise and older adults. Much of the article focuses on the benefits of exercise in improving psychological health and well-being, increasing longevity, and preventing chronic disease and disability. A portion of the article is devoted to exercise recommendations specific to older adults including resistance training, aerobic exercise, balance training, and flexibility. The summary states that even though sufficient data exists regarding the basics of exercise prescription and its importance for older adults, few physicians offer advice to older adults concerning physical activity. "Screening for sedentariness should take place at all major encounters with health care professionals…Exercise recommendations should be integrated into the mainstream of other health care recommendations, rather than being a separate entity." The advice for exercise prescriptions should be specific in terms of modality, frequency, durations, and intensity.

Perceptions of Screening Practices

Chodzko-Zajko, W. J., Ory, M., & Resnick, B. (2004). Beyond screening: Has preenrollment screening become a barrier to participation for sedentary older adults? These experts make the case for new counseling protocols. *Journal on Active Aging, 3(4),* 26-29.

Summary: In this article three experts on screening and physical activity in the elderly argue that the current recommendations for pre-exercise screening, such as asking all adults age 50 and older to have a physical exam, take a stress test, fill out a questionnaire, or some combination thereof, are deterrents to physical activity in the asymptomatic sedentary older adult population and are therefore not useful or even harmful. As evidence, the authors state that the three reasons for performing pre-enrollment screening—to keep exercisers safe from injury and illness, to provide legal protection to fitness/wellness personnel, programs, and businesses, and to help craft personalized and effective exercise programs—are not, as current literature shows, actually being accomplished by the screening. The argument is that, because pre-exercise screening does not accurately predict who may suffer a cardiovascular ill-effect, can be psychologically stressful, is expensive, and does not often account for the most common injuries—musculoskeletal—encountered in older sedentary adults beginning an exercise program, current guidelines should be augmented or replaced. Suggestions are made to do pre-activity counseling, wherein a "customized physical activity preparedness [plan]" could be created utilizing a functional fitness test, the results of which may provide a motivational tool in getting the older adult to exercise.

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Ory, M. G., Resnick, B., Jordan, P. J., Coday, M., Riebe, D., Garber, C. E., et al. (in press). Screening and adverse events: Findings from the Behavioral Change Consortium. *Annals of Behavioral Medicine.*

Summary: This article examines the potential for adverse effects due to screening programs and exercise interventions performed by 11 physical activity intervention studies participating in the trans-NIH Behavior Change Consortium. Key findings included that major adverse events were not directly caused by any of the screening and exercise interventions, although minor ones (such as musculoskeletal injuries) did occur. Furthermore, as stated in the background, because the goal of most interventions and physical activity behavior change programs is to elicit habitual moderate intensity activity from normally sedentary individuals, a program featuring a tailored approach and "start low and go slow" mantra might be better suited than rigorous and enforced screening such as questionnaires, physical examinations, and exercise stress tests (which can often be inaccurate predictors of the risk for cardiac adverse events). This article differentiates study-related adverse events from the more general adverse events, and provides some of the first comparative evidence of the occurrence or lack of these in real-world interventions.

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Resnick, B., Ory, M., Coday, M., & Riebe, D. (Working Paper.) Older adults' perspectives on screening prior to exercise: perceived benefits and barriers.

Summary: This paper utilizes data and opinions collected from older adults at various regional focus groups, conducted at sites where exercise interventions were occurring currently or had in the past occurred, in New York, Texas, Tennessee, and Maryland. Among the findings is that, while many older adults found screening gave them an increased sense of confidence and an assurance that they were physically capable of beginning and completing a physical activity program, many felt that it hindered their participation and progress. Already-active older adults in particular felt that they did not need to be screened before beginning a new activity or joining a new group. Still others who believed this indicated that the benefits of any exercise they could participate in would outweigh the risks of the participation or of remaining sedentary. The article concludes by summarizing the findings, making suggestions for future research, and discussing possible revisions to screening guidelines.

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Resnick, B., Ory, M., Coday, M., & Riebe, D. (Working Paper). Professional perspectives on physical activity screening practices: Shifting the paradigm.

Summary: Through five focus groups including professionals at four different national meetings, the information in this paper intends to explain the current practices and viewpoints of practitioners on the topic of screening adults before exercise participation. The authors found that screening programs currently in use tended to focus on excluding persons from activity rather than facilitating their participation, and that many professionals believed this was not in keeping with the most current recommendations. However, many practitioners felt compelled—e.g., by fear of litigation or because of organizational policies—to adhere to old modes of screening. Furthermore, screening was seen as a beneficial act when it could match persons with

appropriate physical activities, prevent injury or illness, educate, or motivate the participant (among other reasons). Most participants did recognize, however, that the act or method of screening was often a barrier to participation in exercise, which is important to note because of all the recognized benefits of any and all exercise when compared to remaining sedentary. The article concludes with novel recommendations for new screening techniques and outlines some new areas of focus to be pursued in research.

Legal Aspects

Boone, T. (2002). Legal dimensions of exercise physiology practice. *Professionalization of Exercise Physiology Online, 5(3).* Retrieved February 21, 2005, from http://www.css.edu/users/tboone2/asep/LegalDimensions.html.

Summary: This editorial speaks to the legal rights and responsibilities of exercise physiologists employed in public practice. Boone discusses the doctrine of informed consent and consent forms, the need for and legality of "recognized standards of practice" including "'instruction, examination, and practice'," and the ideas of quality of care, accountability, and liability. Boone discusses the four points—a standard of care must exist, the standard of care was breached, the injury was caused by the breach/negligence, and damage/physical or material harm—that a tort case must prove to have merit, as well as provides examples illustrating how each of these might be proved. The notable points herein are that being in breach of a standard may be readily proved when the defendant (here an exercise physiologist) does not keep and maintain good records of what occurs in a visit, and that the condition of "reasonable prudence" is one in addition to continually and fully abiding by the standards of the accrediting organization. Boone lastly talks about having individual liability insurance, and gives ways to minimize legal problems.

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Herbert, D. L. (2000). *Instruction and supervision legally required for exercise equipment*. Retrieved February 21, 2005, from http://www.clubsafety.com/lawnotes/august2000.htm.

Summary: While not specifically about screening, this article discusses the legal establishment of the precedent requiring health and fitness clubs to provide reasonable care to protect their members and participants from "injury while on the premises." While the court case highlighted in this brief featured a broken bone rather than a cardiac arrest, future interpretations of the court's opinion (not only in the state of issue, but, as Herbert implies, soon in most other states as well) could extend as far as cardiac screening, screening for musculoskeletal injury, and providing emergency response.

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Herbert, D. L., Henry, T. G., & Herbert, W. G. (2002). *Legal aspects of preventive, rehabilitative and recreational exercise programs (4th ed.).* Canton, OH: PRC Publishing, Inc.

Summary: This book was written to provide practical and useful information regarding a variety of legal issues surrounding the screening for and implementation of exercise programs for persons of all ages. The book discusses the following topics: basic legal concepts and

terminology; contemporary programs and settings; potential legal problems associated with facilities, equipment, personnel, and practices; negligence, malpractice, and expert witnesses; the authorized and unauthorized practice of medicine by allied health professionals; standards of practice and competency; informed consent, documentation, communications, and insurance; the use of prospective waivers of liability/releases; and emergency response considerations for health and fitness facilities. The book also provides numerous example forms such as various informed consent forms, agreement and release of liability, medical approval, various 'express assumption of risk' forms, and medical referral forms.

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http://www.aarp.org/health-active/

Active for Life. "Active for Life: Increasing Physical Activity Levels in Adults Age 50 and Older!"
http://www.activeforlife.info/default.aspx

American College of Sports Medicine. "Exercising Safely."
http://www.agingblueprint.org/PDFs/Exercising_Safely.pdf

American Society of Exercise Physiologists. Homepage.
http://www.asep.org/

Centers for Disease Control and Prevention: National Center for Chronic Disease Prevention and Health Promotion. "Nutrition and Physical Activity."
http://www.cdc.gov/nccdphp/dnpa/

National Blueprint. "Increasing Physical Activity Among Adults Aged 50 and Older."
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The National Council on the Aging. Homepage.
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National Institute on Aging. "Exercise: A Guide from the National Institute on Aging."
http://www.niapublications.org/exercisebook/index.asp

National Institutes of Health: National Institute on Aging & National Library of Medicine. "NIH Senior Health."
http://nihseniorhealth.gov/

The Robert Wood Johnson Foundation. "Resource Center: Active Living, Obesity, and Nutrition."
http://www.rwjf.org/programs/physicalActivity.jsp