

PHYSICAL ACTIVITY AND HEALTH GUIDELINES

*Recommendations for Various Ages, Fitness Levels,
and Conditions from 57 Authoritative Sources*

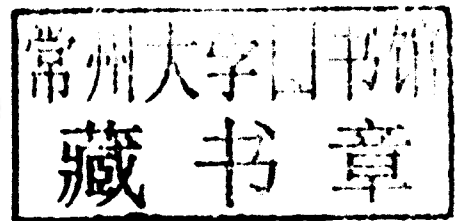


Riva L. Rahl

Physical Activity and Health Guidelines

Recommendations for Various Ages, Fitness Levels,
and Conditions from 57 Authoritative Sources

Riva L. Rahl, MD
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Human Kinetics

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**To my family.
You all inspire and amaze me.**

FOREWORD

Physical Activity and Health Guidelines: Recommendations for Various Ages, Fitness Levels, and Conditions from 57 Authoritative Sources by Riva Rahl, MD, is the first compilation and interpretation of guidelines for recommending physical activity in both clinical and public health settings. Publication of such guidelines by various professional organizations and government agencies worldwide was initiated in the 1970s and has been stimulated, in part, by the large volume of new scientific data available on the complex relations between profiles of habitual physical activity and the numerous health outcomes that occur throughout the life span. In addition to the extensive review of the recommendations that have been made for youth, adults, older adults, and patients with various diseases or disabilities, Dr. Rahl provides commentary on the implications for the implementation of the recommendations. This review is a resource for health and exercise professionals who need to locate specific recommendations or want to compare one set of recommendations with others. Also, it is a unique resource for students interested in understanding the evolution of the development of physical activity and health guidelines over the past four decades.

Physical Activity and Health Guidelines is organized into four parts and 18 chapters, which allow easy access to specific recommendations or related information. Part I, General Health and Fitness Guidelines, includes a historical background of physical activity guidelines and a conceptual framework for prescribing physical activity to improve health. Part II, Physical Activ-

ity Guidelines by Population, provides an overview of recommendations for generally healthy persons throughout the life span, including a particularly informative chapter on guidelines and advice regarding exercise by pregnant and postpartum women. Part III, Physical Activity Guidelines by Disease States, reviews guidelines for the prevention of major chronic diseases with specific chapters focused on patients with cancer, cardiovascular disease and hypertension, arthritis and osteoporosis, diabetes, asthma, and neuromuscular disorders. Having all of these recommendations for specific patient populations in one location should prove especially valuable to physicians and other clinicians who provide exercise recommendations to a diverse population of patients. Part IV, Guidelines for Exercise Testing and Beyond, addresses issues aligned to exercise recommendations, including a chapter on the rationale and procedures for exercise testing in adults and children, a chapter reviewing nutrition guidelines especially when they have been incorporated with physical activity guidelines, and a final chapter on guidelines related to logistical issues involved in the implementation of a health-oriented program of physical activity.

As a practicing physician at the Cooper Clinic and medical director for the Cooper Aerobics Center in Dallas, Dr. Rahl has integrated a high-quality review of existing exercise guidelines with her substantial experience in implementing those guidelines in a clinical setting. This combination of expertise and experience has resulted in a valuable addition to the professional exercise literature.

William L. Haskell
March 2010

PREFACE

This book is designed for anyone interested in exploring the recommendations for exercise and health across all age groups and common disease states. Many people will benefit from this text, including the general population interested in fitness and health, students studying toward fitness and health certifications, and professionals setting up fitness and health programs for companies or civic organizations.

Although an abundance of information is available on physical activity and exercise recommendations for better health, this book is the first single source dedicated to compiling the many different recommendations on physical activity. This book presents a comprehensive overview of the current guidelines from the appropriate national and international organizations as well as provides helpful information for implementing these guidelines. It also includes a historical record of some of the earliest guidelines and covers significant milestones up to and including the recently published *Physical Activity Guidelines for Americans (PAGA)*. *PAGA* is notable in that it contains guidelines for many different subsets of the American population and is based on the most comprehensive review to date of the scientific literature on physical activity and health. More than 200 health professionals met over a span of 2 years to discuss and create these guidelines, which were published by the U.S. Department of Health and Human Services. This book refers to the *PAGA* guidelines as well as to many others as it details the physical activity recommendations for individuals beginning in infancy all the way through older adulthood, and for people with chronic disease or disability ranging from diabetes, asthma, osteoporosis, and osteoarthritis to cerebral palsy, stroke injury, and others. In addition, it addresses national guidelines geared toward the prevention of common diseases such

as cancer, coronary artery disease, and the metabolic syndrome.

This text also explains the core components used to develop an exercise program, with attention to national guidelines, so that readers can be prepared to implement an appropriate exercise program, whether for an individual, a corporation, or a community group. Information on how physical activity recommendations can help people meet weight management guidelines is also included, as there is a close association between obesity and a sedentary lifestyle. An entire chapter is dedicated to the national dietary guidelines that have been published alongside physical activity guidelines; these are also organized by age group and disease state where available. Guidelines for cardiac and other exercise testing are included, as many health organizations utilize this information not only in implementing and evaluating physical activity programs but also in assessing the safety of recommending a program for certain individuals.

Part I of this book covers the history of physical activity guidelines as well as some of the science behind the relationship between physical activity and health. Chapter 2 describes the general guidelines for all Americans. A review of the components of a personal exercise program, provided in chapter 3, completes the first section. Part II covers physical activity guidelines by population, including infants, toddlers, school-aged children and adolescents, pregnant women, and adults who are older and even frail. The chapters in part III are arranged by disease state, and they cover physical activity guidelines for individuals as they relate to chronic health conditions such as hypertension, coronary artery disease, diabetes, cancer, arthritis, osteoporosis, asthma, cerebral palsy, and other disabling conditions. Part IV, the final part of the book, contains guidelines for exercise and

cardiac testing, national nutritional guidelines as they relate to physical activity, and guidelines concerning the implementation of a physical activity program. The latter includes advice for setting up a home gym, selecting activity and health equipment, joining a fitness facility, and selecting appropriate exercise videos and other associated devices. At the end of this book is an appendix containing Web resources to help the interested reader look up more details on the various guidelines presented throughout the text.

Each set of physical activity and exercise guidelines is presented in a template that names the date issued (or most recently updated), the issuing organization, the target population, and the location of the source from which the guidelines are taken. Wherever possible, Web links to the original sources are provided, so that the reader can easily find the most recent version available. Many guidelines follow the principles of the physical activity prescription, dividing the physical activity recommendations into those for aerobic exercise, resistance training, and flexibility training. These are presented in table format for easy viewing. When provided, the frequency, intensity, duration, and type of activity for the three components of the physical activity prescription are included in these tables. Some guidelines do not address these specifics of the physical activity prescription, while others simply do not recommend that the target population participate in one component or another. Other organizations emphasize solely the aerobic element and do not comment on strength or flexibility. For incomplete guidelines, the template contains whatever information is available and designates which information is not specified. For example, many recommendations specify all the details for aerobic exercise but simply mention that flexibility training should be considered as part of a warm-up or cool-down. In these instances, the flexibility row within the table

does not include much detail. Other guidelines are somewhat vague, even when it comes to the prescription for aerobic exercise, and these guidelines are listed within the chapter text.

This book is focused on guidelines that apply to Americans and therefore most of the guidelines referenced herein are issued by American entities. Some notable guidelines, however, are established by important international bodies (such as the International Osteoporosis Foundation or the World Cancer Research Fund) and prescribe recommendations that apply just as well to inhabitants of the United States as they do to people from around the world. Thus this text includes relevant international guidelines. In a few cases, guidelines issued by other national entities (such as the Canadian Hypertension Society or the Society of Obstetricians and Gynaecologists of Canada) are included; these serve to reiterate the similarities they share with American guidelines and to highlight important differences that might prompt discussion. In other cases, foreign guidelines might simply offer more detail than the corresponding American recommendations.

Having gained an understanding of the various physical activity recommendations available today, readers may find they require access to the knowledge, equipment, and adjunctive tools needed to follow and advance these recommendations. The appendixes of this text provide these resources, divided by topic, and include links to key organizations, statements, Web sites, and other tools related to physical activity and health.

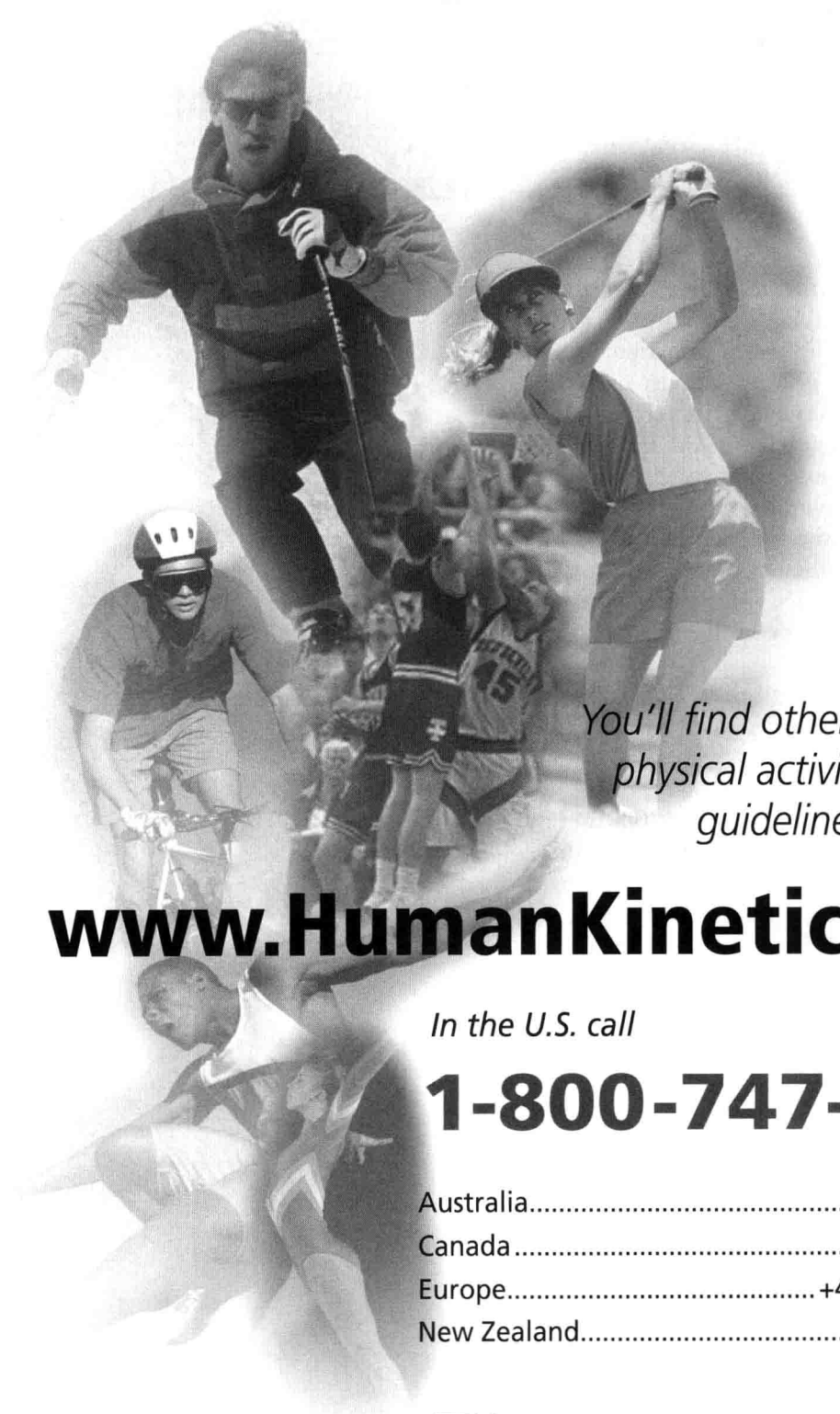
Nowhere else is there a written work that pulls together all this information into a single source. After finishing this book, readers will have a complete understanding of the needs of any individual or group beginning an exercise program as well as have the pertinent background information and adjuncts needed to design an exercise program and put it into action.

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Thank you to my husband, Brian, for your patience and support throughout this work. You accepted my aspiration for this ambitious project and helped out in so many ways. Your understanding and encouragement for more than a year mean a lot to me. I appreciate your support of my running, my career, and our family. To my wonderful boys, Evan and Reagan, thank you for your constant love, growth, and joy. Thanks also to my mother, Suzie; my father, Dick; and of course my sister, Marisa, for providing breaks so I could keep working on the book. Dad is my original inspiration for lifestyle physical activity, having walked 3 miles each way to work every day. Thank you also to John Baer not only for being my constant running partner but also for introducing me to Dr. Cooper several years ago.

This book came about after a conversation with Dr. Michele Kettles, who suggested I talk to Mike Bahrke at Human Kinetics, who brought this project to my attention. I appreciate the interest and curiosity that my friends, family, and patients have shown as I worked through writing this book. I am encouraging each and every one to be physically active!

I also want to thank my team at the Cooper Clinic—Claudia Hilton, Jeanne Finseth, David Stewart, and Marie Williams-Albright—for allowing me to focus on my patients and give them the best experience possible. Lastly, I am grateful for all the contributions of Dr. Kenneth Cooper to the fields of preventive medicine, fitness, and aerobics; without all your work and perseverance, I would not have the opportunity to do what I love to do every single day.



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General Health and Fitness Guidelines

Chapter 1 introduces the history of physical activity and health guidelines. It then details some of the science behind the relationship between physical activity and health and presents the benefits and risks of regular physical activity. Basic concepts as they relate to physical activity are defined. Many of these concepts are repeated in the various guidelines included throughout the text as well as in the physical activity and health literature.

Chapter 2 introduces the general physical activity guidelines for adults, presenting both current and historical guidelines from national organizations in the United States, international, and state organizations. Because guidelines vary considerably—in both the recommendations and how to achieve the recommendations—the different purposes of each of the guidelines are discussed. Guidelines from the American College of Sports Medicine are presented alongside those of the American Heart Association, U.S. Department of Health and Human Services, and U.S. Office of the Surgeon General.

Chapter 3 introduces the personal exercise program. While national physical activity guidelines make broad suggestions for overall improved health, the personal exercise prescription individualizes exercise by dividing physical activity into three components: aerobic exercise, strength training, and flexibility exercise. Then the four variables of the FITT principle—frequency, intensity, time, and type—are delineated for each of these components in order to provide a specific plan. Chapter 3 also includes physiology concepts to help illustrate the guidelines.



Exploring the Relationship Between Physical Activity and Health

Physical inactivity is a major public health problem, and an estimated 200,000 deaths occurring in the United States each year are related to a sedentary lifestyle (Powell and Blair 1994). Recent data incorporating poor diet along with physical inactivity suggest that the two together are responsible for more than 400,000 premature deaths each year, accounting for 1 in 6 deaths in the United States (Mokdad and others 2004)! The causes of these deaths include, but certainly are not limited to, cardiovascular disease, type 2 diabetes, and cancers of the colon and breast.

Both physical activity and exercise (which are differentiated later in this chapter) play a central role in maintaining good health. They are a vital part of preventive medicine because they affect present and future health tremendously at a relatively low cost compared with other interventions. Because physical activity is so important, many public health organizations have emphasized the value of participating in physical activity and so have established many sets of guidelines. These guidelines include not only activity guidelines

set by the Centers for Disease Control and Prevention (CDC), the American Heart Association (AHA), the U.S. Office of the Surgeon General, the U.S. Department of Health and Human Services (USDHHS), and the American College of Sports Medicine (ACSM) but also the Dietary Reference Intakes (DRIs) and recommendations in the *Dietary Guidelines for Americans* provided by the Institute of Medicine (IOM). In the United States, the first national physical activity guidelines for the general population were published by the ACSM in 1976. Since that time, many updates have been made not only to these general recommendations but also to guidelines subsequently created for youths, pregnant women, older adults, and other special populations—all of which are included in this book. For specific disease states, national or other respected bodies also periodically issue guidelines, and these are included in the book as well.

There is a large body of evidence supporting the relationship between physical activity and health; less evidence supports the efficacy of the specific activity recommendations, but they are

under study. It is important to differentiate guidelines developed for general health maintenance and disease prevention from those created with more specific goals in mind. For example, the growing obesity epidemic has led to guidelines focused solely on weight loss or prevention of weight gain. Although the recommended quality and quantity of physical activity differ somewhat depending on which guidelines are used, the objectives of *all* of the various guidelines are to improve health through enhanced metabolic, structural, and physiological parameters. As the volume or intensity of activity increases, more significant health improvements can be achieved; there is a dose–response relationship between physical activity and health. The minimal recommendations originally set by the Office of the Surgeon General and more recently by the Physical Activity Guidelines Advisory Committee may enable a degree of improved health while being minimal enough to encourage the high number of sedentary individuals in the United States to begin at least *some* exercise. Other guidelines that recommend more intense and longer durations of exercise may reduce the risk for chronic disease, prevent weight gain, and maintain weight loss in people who were previously obese. Other recommendations focus on improving functional capacity or avoiding disability associated with specific disease states. As research continues to demonstrate the relationship between physical activity and health outcomes, individuals may be able to select physical activity models appropriate for their specific health risks, desired physiological benefits, and personal preferences.

History and Development of Physical Activity Guidelines

The ACSM was founded in 1954 by 11 physicians, physiologists, and educators. Around the same time, the President’s Council on Youth Fitness was formed under Dwight D. Eisenhower in response to the finding that American youths were relatively unfit when compared with their European counterparts. Both groups endeavored to promote fitness for Americans. The ACSM was the first to develop physical activity guidelines that were widely disseminated in the United

States. These initial guidelines focused on promoting fitness instead of health for two reasons: (1) There was an accumulation of knowledge regarding fitness benefits rather than general health benefits and (2) fitness for sport participation was and continues to be one of the primary areas of focus of the organization. The ACSM published the first edition of *ACSM’s Guidelines for Exercise Testing and Prescription* in 1976, and, now in its eighth edition, this publication remains one of the most widely referenced guidebooks of its kind. The ACSM was also the source of the first position stand on physical activity and health for the general public, which was issued in 1978. A position stand is created by a group of leaders within an organization to reflect their thoughts on a specific topic. The initial position stand of the ACSM established the relationship between physical activity and good health and suggested a concise guide for activity within the framework of the statement. Earlier in the 1970s, the AHA issued a handbook on the use of endurance exercise training and testing for the diagnosis and prevention of heart disease. However, until the AHA (along with other groups, including the ACSM) identified physical inactivity as a risk factor for coronary artery disease (CAD) in 1992 and the Office of the Surgeon General issued the landmark *Physical Activity and Health: A Report of the Surgeon General* in 1996, the ACSM’s guidelines served as the primary source of information for fitness and activity recommendations in the United States.

The ACSM has since published position stands on several areas of focus, including cardiorespiratory fitness, muscle fitness, flexibility, body composition, disease prevention, hypertension, and osteoporosis. These position stands are widely regarded as national guidelines because of the wealth of scientific knowledge accumulated to develop them.

Motivated by the deteriorating fitness and growing waistlines of Americans that began a few decades ago, the U.S. federal government became involved in recommending physical activity for health. In 1979, it issued the first *Healthy People* report, recommending endurance exercise for health promotion and disease prevention; the most recent version, *Healthy People 2010*, was issued in 2000 and put forth goals for individuals

and groups to achieve improved health through many different parameters. This latest report is expected to be supplanted by *Healthy People 2020*. The government has also been involved in recommendations through the publication of various reports by the Office of the Surgeon General, the *Dietary Guidelines for Americans*, and reports by the USDHHS.

Despite the government involvement, the ACSM guidelines continue to be the health and fitness industry's standard template for physical activity and exercise prescription for both healthy populations and special populations, particularly when the goal is improved fitness. Other guidelines such as the *Physical Activity Guidelines for Americans (PAGA)* recently published by the USDHHS (USDHHS 2008), the newer joint AHA and ACSM guidelines (Haskell and others 2007), and the 2005 *Dietary Guidelines for Americans* (USDHHS 2005) are considered appropriate for achieving general health or reducing cardiovascular and cancer risk. In September of 2002, the IOM—a private organization—made headlines by issuing new physical activity guidelines calling for 60 or even 90 min of daily activity. Many people assumed these recommendations were intended to replace those referenced in the 1996 report issued by the Office of the Surgeon General. The IOM recommendations, however, were designed to address the burgeoning obesity epidemic; the report suggested that 60 min of daily, moderate-intensity physical activity helps prevent weight gain and accomplishes additional weight-independent health benefits. As these guidelines were part of a focus on nutrition and weight management, their goal was maintaining a healthy weight; the difference in focus between this report and others reflects the importance of interpreting various guidelines in the context of their stated health goals.

Over time, there have been shifts back and forth between general and specific guidelines. Earlier guidelines for promoting physical activity are somewhat vague. As the idea of regular physical activity for everyone has become more accepted in the United States, guidelines have become more detailed. For example, in 1996 the Office of the Surgeon General recommended 30 min of moderate-intensity exercise on most if not all days of the week. By the 2007 update to the

joint ACSM and AHA guidelines, the recommendations were detailed such that individuals were given options of different intensities, durations, frequencies, or combinations of those. The most current national guidelines, *PAGA*, actually return to a simpler recommendation, simply delineating a total volume of weekly activity and giving examples to illustrate a number of ways to achieve the suggested volume. Additionally, the recent guidelines provide more details for resistance exercise, flexibility, balance, and other important fitness components.

Because many healthy young adults may view vigorous exercise negatively, newer guidelines have emphasized that a lower dose of activity—in both intensity and duration—is acceptable and provides health benefits. A greater dose, of course, confers more and larger health benefits but may not be practical or realistic for everyone. This shift to more modest recommendations reflects the strategy to promote activity that provides the greatest benefit for the greatest number of people. Motivating the multitude of sedentary Americans to commit to a basic but critical amount of activity has enormously positive economic and health implications.

Basic Concepts and Definitions

Physical activity is defined as any bodily movement produced by skeletal muscles that results in caloric expenditure (Caspersen 1985). Physical activity is further qualified as lifestyle, light, moderate, or vigorous. These classifications help determine what quantity of activity is recommended. There is no consensus on the exact definition of these various intensity levels. Some guidelines define intensity levels while others just suggest that activity be performed at a particular level. Subsequent sections of this chapter present examples of subjective or objective measures of these classifications and illustrate the various differences in these classifications.

Physical fitness is the body's ability to perform specific tasks or activities for a prolonged duration without experiencing undue physical stress or fatigue. The scope of physical fitness includes multiple parameters such as cardiorespiratory