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Cardiovascular disease (CVD) in older Americans imposes a huge burden in mortality, morbidity, disability, functional decline, and health care costs. In light of the projected growth of the population of older adults over the next several decades, the societal burden attributable to CVD will continue to rise. There is thus an enormous opportunity to foster successful aging and to increase functional life years through expanded efforts aimed at CVD prevention. This article provides an overview of the epidemiology of CVD in older adults, including an assessment of the impact of CVD on mortality, morbidity, and health care costs.	
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Many elderly patients have hypertension, although it is more likely to go untreated in this population. Treatment goals are the same in elderly patients as in younger patients, but elderly patients are more likely to have multiple comorbidities, which must be factored into treatment plans. This article highlights the unique challenges in treating this population.	
<b>Hyperlipidemia in Older Adults</b>	<b>591</b>
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Older adults carry the highest risk for coronary artery disease and the highest burden of atherosclerosis. Although most clinical trials of cholesterol-lowering therapy have not specifically targeted older persons, growing evidence supports treatment of elevated low-density lipoprotein cholesterol levels in older patients, especially those at high risk for coronary events. The decision to treat a high or high-normal cholesterol level in an elderly individual must be individualized based on chronologic and physiologic age. This article summarizes current data on lipid-lowering therapy in older adults and the management of hyperlipidemia in elderly patients.	
<b>Diabetes and Cardiovascular Disease Prevention in Older Adults</b>	<b>607</b>
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Cardiovascular disease is the major cause of death as well as a leading cause of disability and impaired quality of life in older adults with diabetes. Therefore, preventing cardiovascular events in this population is an important goal of care. Available evidence supports the use of lipid-lowering	

agents and treatment of hypertension as effective measures to reduce cardiovascular risk in older adults with diabetes. Glucose control, smoking cessation, weight control, regular physical activity, and a prudent diet are also recommended, although data supporting the efficacy of these interventions are limited. While reducing cardiovascular morbidity and mortality remains a primary objective of preventive cardiology in older adults with diabetes, the impact of these interventions on functional well-being, cognition, and other geriatric syndromes requires further study.

**The Obesity Paradox in the Elderly: Potential Mechanisms and Clinical Implications** 643

Antigone Oreopoulos, Kamyar Kalantar-Zadeh, Arya M. Sharma, and Gregg C. Fonarow

The prevalence of overweight and obesity in the elderly has become a growing concern. Recent evidence indicates that in the elderly, obesity is paradoxically associated with a lower, not higher, mortality risk. Although obesity in the general adult population is associated with higher mortality, this relationship is unclear for persons of advanced age and has led to great controversy regarding the relationship between obesity and mortality in the elderly, the definition of obesity in the elderly, and the need for its treatment in this population. This article examines the evidence on these controversial issues, explores potential explanations for these findings, discusses the clinical implications, and provides recommendations for further research in this area.

**Physical Activity and Prevention of Cardiovascular Disease in Older Adults** 661

David M. Buchner

There is strong evidence that regular physical activity reduces risk of cardiovascular disease. Building on the evidence review for the *2008 Physical Activity Guidelines for Americans*, this article summarizes the recommended amounts and types of physical activity for the primary prevention of cardiovascular disease in older adults. Key guidelines are largely based on current understanding of the dose-response relationship between amount of physical activity and risk of chronic disease. In part due to the preventive effects on cardiovascular disease, physical activity has beneficial effects on functional limitations and health-related quality of life in older adults. Gaps in research on physical activity and cardiovascular health are discussed, with an emphasis on the need for research on how sedentary time affects risk of cardiovascular disease and other chronic illnesses.

**Effects of Physical Activity on Cardiovascular and Noncardiovascular Outcomes in Older Adults** 677

Jacob R. Sattelmair, Jeremy H. Pertman, and Daniel E. Forman

Aging is associated with a cascade of morphologic and physiologic changes that naturally predispose older adults to progressive weakening, functional decline, morbidity, disability, poor quality of life, and increased mortality. Physical activity moderates such insidious aging patterns and

is a vital preventive and therapeutic strategy to optimize health throughout the aging process. Regular exercise provides many physiologic benefits, reduces risk of disease outcomes, and triggers important psychological gains. Advanced age presents distinctive obstacles to maintaining a physically active lifestyle. Individualized exercise strategies and regimens make it possible, however, for every elderly adult to benefit from physical activity.

**Impact of Strength and Resistance Training on Cardiovascular Disease Risk Factors and Outcomes in Older Adults** 703

Mark A. Williams and Kerry J. Stewart

In older persons with and without cardiovascular disease, muscular strength and endurance contribute to functional independence and quality of life, while reducing disability. Aging skeletal muscle responds to progressive overload through resistance training. In men and women, strength improves through neuromuscular adaptation, muscle fiber hypertrophy, and increased muscle oxidative capacity. The increase in muscle oxidative capacity is due to the combination of strength development and aerobic exercise often used in resistance-type circuit training. Even in the oldest persons, resistance training significantly increases strength and gait velocity, improves balance and coordination, extends walking endurance, and enhances stair-climbing power. This article reviews the physiologic response to resistance training in older adults and discusses the impact of resistance exercise training on cardiovascular risk factors.

**Cellular Mechanisms of Cardioprotection by Calorie Restriction: State of the Science and Future Perspectives** 715

Emanuele Marzetti, Stephanie E. Wohlgemuth, Stephen D. Anton, Roberto Bernabei, Christy S. Carter, and Christiaan Leeuwenburgh

Evidence from animal models and preliminary studies in humans indicates that calorie restriction (CR) delays cardiac aging and can prevent cardiovascular disease. These effects are mediated by a wide spectrum of biochemical and cellular adaptations, including redox homeostasis, mitochondrial function, inflammation, apoptosis, and autophagy. Despite the beneficial effects of CR, its large-scale implementation is challenged by applicability issues as well as health concerns. However, preclinical studies indicate that specific compounds, such as resveratrol, may mimic many of the effects of CR, thus potentially obviating the need for drastic food intake reductions. Results from ongoing clinical trials will reveal whether the intriguing alternative of CR mimetics represents a safe and effective strategy to promote cardiovascular health and delay cardiac aging in humans.

**Effects of Caloric Restriction on Cardiovascular Aging in Non-human Primates and Humans** 733

Christina Cruzen and Ricki J. Colman

Approximately one in three Americans has some form of cardiovascular disease (CVD), accounting for one of every 2.8 deaths in the United States

in 2004. Two of the major risk factors for CVD are advancing age and obesity. An intervention able to positively impact both aging and obesity, such as caloric restriction (CR), may prove extremely useful in the fight against CVD. CR is the only environmental or lifestyle intervention that repeatedly has been shown to increase maximum life span and to retard aging in laboratory rodents. This article reviews evidence that CR in nonhuman primates and people has a positive effect on risk factors for CVD.

**Primary and Secondary Prevention of Cardiovascular Disease in Older Adults:  
A Status Report**

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Peter Kriekard, S. Michael Gharacholou, and Eric D. Peterson

This article reviews cardiovascular disease (CVD) prevention in older patients, highlighting results from recent clinical studies related to primary and secondary prevention. Many of these studies demonstrated greater absolute reductions in major cardiovascular events among older, higher-risk populations compared with younger patients. Guideline recommendations for CVD risk factor modification are also reviewed with emphasis on issues pertaining to the older adult population.

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