

## A Review of Cardiovascular Changes in the Older Adult

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The number of older adults in the United States is projected to nearly double between 2005 and 2030 with approximately 71 million older adults accounting for roughly 20% of the U.S. population (Centers for Disease Control and Prevention and the Merck Company Foundation, 2007). Of particular note is the fact that we currently have more than 73,000 persons aged 100 years or more in the United States (Administration on Aging, 2007). This marks a 97% increase in that population group since 1990. With the current demographics, rehabilitation settings will see an increasing number of older adults.

In anticipation of an increased number of older adults using care settings, the Institute of Medicine (IOM) commissioned an ad hoc committee to determine the healthcare needs of Americans older than 65 years of age and assess what was needed to care for this population. On April 14, 2008, the IOM released the special report "Retooling for an Aging America: Building the Health Care Workforce." The committee recommended a three-prong approach to meet the needs of the older population that included (1) enhancing the geriatric competence of the entire workforce; (2) increasing the recruitment and retention of geriatric specialists and caregivers; and (3) improving the way care is delivered. This article addresses the first point—enhancing the geriatric competence of the workforce.

Recognizing normal changes of aging from pathological changes may be difficult to determine. Healthcare providers may consider normal changes of aging to be pathological changes and pathological changes to be "normal" and thus may not provide appropriate care to older adults. Although there are many normal changes that occur with aging, this article will summarize the pertinent changes of the cardiovascular system because cardiovascular disease is the most common cause of hospitalization and death in older adults in Western society (McCance & Huether, 2006).

Some controversy exists regarding the effects of normal aging of the cardiovascular system. Separating the physiologic from the

pathologic alteration is difficult because of the presence of arteriosclerosis in a majority of older adults, making it hard to determine whether normal aging changes were the cause of the arteriosclerosis or whether the arteriosclerosis appeared independently. Also, because we know older adults are typically not included in clinical trials, our data on older adults are limited.

That said, there are effects of aging that affect the cardiovascular system both structurally and physiologically. However, there is increasing evidence that by modifying one's lifestyle (i.e., changing diet and increasing exercise) some of these changes may be negated (Ferebee, 2006). Structural changes include increased heart weight; decreased number of myocardial cells with enlargement of remaining cells; increased left ventricle wall thickness; increased arterial stiffness; increased elastin levels; increased collagen levels; increased left atrium size; decreased aortic distensibility; and decreased vascular tone (McCance & Huether, 2006). Functionally, there is decreased diastolic pressure (during initial filling of the heart); decreased diastolic filling; decreased reaction to beta-adrenergic stimulus; increased systolic pressure; increased arterial pressure; increased wave velocity; increased left ventricular end-diastolic pressure; and elongation of muscle contraction phase, muscle relaxation phase, and ventricle relaxation.

With the above referenced normal aging changes, the following findings are what you might observe in your practice:

- At rest, there are no changes in ejection fraction, stroke volume, or cardiac output in the older adult (Plahuta & Hamrick-King, 2006).
- Rigidity in the coronary vessels increases the risk of atherosclerotic buildup, especially in those with lifestyle risk factors (Ferebee, 2006).
- Normal changes in an EKG for an older adult include slightly increased PR, QRS, and Q-T intervals (Ferebee; Jett, 2008).
- Systolic pressure may be increased due to loss of arterial distensibility, while diastolic remains the same; thus there is an increase in pulse pressure (Ferebee).

- Older adults are less sensitive to the baroreceptor regulation of blood pressure, particularly with change in position. This causes a fluctuation in blood pressure and contributes to postural hypotension (Smith & Cotter, 2008).
- An older adult's heart rate does not increase as quickly in exercise as someone younger and does not decrease as rapidly after exercise.
- S4 heart sounds are not uncommon in older adults (Jett).
- Fifty percent of older adults have a grade 1 or 2 systolic murmur (Jett).
- In normal aging, cardiac reserve declines (Jett; Smith & Cotter).


Typically these changes do not affect function of the individual; however, they present significant challenges for the older adult if the need for blood flow is greater (e.g., trauma or surgery, during illness or stress when demands for oxygen or energy are greater, or with changes in posture). During illness or surgery, it takes longer for the heart of the older adult to accelerate to meet sudden demands. This translates into the increased heart rate that one might expect to see when a person is in pain, anxious, febrile, or hemorrhaging (Jett, 2008). Instead the nurse must depend on other signs of distress in the older adult.

As an example, cardiovascular conditions may present differently in older adults. Crushing chest pain and diaphoresis are not the classic symptoms of an acute myocardial infarction in an older adult. Instead one might see a sudden onset of dyspnea accompanied by anxiety and confusion (Amella, 2004). This absence of pain is particularly evident in those with long-standing angina and poorly controlled diabetes (Amella).

In heart failure, the beginning signs of failure may be difficult to detect in an inactive person with dependent edema. Often, the only changes may be decreased appetite, a slight weight gain, and poor sleep patterns (Amella, 2004).

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Those in pediatric care use a common refrain “children are just not small adults,” and a similar statement could be made about the older adult. Caring for older adults is different than caring for young or middle-aged adults. One needs to be knowledgeable about normal changes of aging and how pathology may present differently in this population. 

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