# Dyspnea in the Elderly

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**KEYWORDS**

• Elderly • Geriatric • Dyspnea • Respiratory • Congestive heart failure
• Chronic obstructive pulmonary disease • Oxygenation • Ventilation

**KEY POINTS**

- Acute and Chronic Dyspnea is a frequent presentation of Elderly Patients to the Emergency Department.
- Elderly patients have several anticipated alterations in cardiac and pulmonary physiology that contribute to illness when presenting with acute dyspnea.
- Understanding the important historical and physical findings in certain diseases assist with evaluation and management of typical diseases that cause dyspnea in the elderly.

## KEYWORD DEFINITIONS

### *Dyspnea*

Throughout the medical literature and clinical practice, many terms and definitions are encompassed by the broad term of *dyspnea*. These descriptions range from breathlessness, to painful breathing, to air hunger, to shortness of breath. There are many more terms used by patients to try to express the symptoms that they are experiencing. To more broadly define dyspnea to fully include each individual experience this article will use the definition proposed by the American Thoracic Society: "Dyspnea is a term used to characterize a subjective experience of breathing discomfort that consists of qualitatively distinct sensations that vary in intensity."[1] Under this broad definition, each individual's personal and subjective description of any form of discomfort related to the physiologic act of breathing will be included in the term *dyspnea*.

### *Elderly*

Traditionally in medicine and society as a whole the term *elderly* is used to describe any person older than 65, regardless of their health or frailty score.[2] We will use this definition; however, special emphasis is given to those with elevated frailty scores or with multiple comorbid medical conditions that are prevalent in advanced age.

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## INTRODUCTION

Over the last several decades, the aging population has continued to expand and grow. According to the US Census Bureau, by 2050 the elderly population is estimated to reach a staggering 20.9% of the US population with a total 83.739 million people.[3,4] With this boom of the geriatric population comes an increase in a new variety of geriatric-specific symptoms and conditions, along with an increase in encounters between the geriatric patients and acute care physicians. Among the top 3 complaints of these patients is dyspnea,[5] and with the projected increase of the geriatric population over the next 35 years, it can be expected that this number will continue to grow exponentially. With a substantial increase in this patient population, it is increasingly important to understand the unique characteristics of evaluating and treating elderly patients and specifically to understand the unique pathology and physiology of dyspnea in this patient population.

## RELEVANT PHYSIOLOGY IN THE GERIATRIC POPULATION

The growth of the aging population poses an ever-increasing need to adapt care and acute interventions while addressing the elderly patient in the acute care setting. To do this, one must first understand the differences in the physiology of the elderly patient versus the average adult patient, specifically, the physiology of the respiratory and cardiovascular system and this effect on the perception of dyspnea.

### *Cardiovascular Physiology*

Among the changes that occur to the cardiovascular system, several can have a direct or indirect effect on the symptoms of dyspnea.

As individuals age, the connective tissue that constitutes our cardiovascular system tends to stiffen and become less compliant.[6,7] This, in turn, leads to decreased compliance and overall stiffening of veins, arteries, and myocardium. There are consequences of this change on our cardiovascular system as a whole. Arterial stiffening causes increase in systolic hypertension and impaired impedance matching between the heart and the aorta and can lead to myocardial hypertrophy. Venous stiffening causes a decreased ability to maintain stable cardiac preload, which leads to increased volume and distribution dependence.

Myocardium stiffening can lead to diastolic heart failure. Additionally, within the myocardium, there is a stiffening and fibrosis of the cardiac skeleton, which can cause valvular, disease particularly with calcification at the base of the aortic valve.

Further effects of aging on the cardiovascular system include the decrease in the response to β-receptor stimulation. This decrease contributes to a reduced heart rate and contractile response to hypotension, exercise, and exogenous catecholamine administration.[7] Additionally, atrial pacemaker cells are reduced in function, which results in a decreased intrinsic heart rate.

These consequences of aging contribute to increased systolic blood pressures, decreased left ventricular end-diastolic volumes, decreased stroke volumes, and decreased cardiac outputs. Subsequently, the heart becomes dependent on volume status, which dampens the ability to physiologically respond to any changes within the cardiovascular system.[7]

### *Respiratory Physiology*

With age, the lungs undergo significant structural and physiologic changes, which include a decrease in elastic recoil and lung volumes, enlargement of air spaces, decrease in alveolar surface area, decreased compliance of chest wall, and reduction

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