



# Foundations of Public Health

## Part II: Biological Foundations for Public Health

### RESPIRATORY HEALTH

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#### Introduction

Humans and other animal species continually need to be able to take in oxygen from the environment and distribute to all tissues, and the carbon dioxide that is generated needs to be excreted. The lungs are the interface between our blood stream and the external environment and the site where oxygen (O<sub>2</sub>) is taken up and carbon dioxide (CO<sub>2</sub>) leaves the bloodstream and is expelled to the environment. The intimacy of this interface between our internal and external environment and the continual need to exchange air with the environment has a major impact on health for several reasons. First, continual exposure of the respiratory tract to air from the environment provides an important portal for entry of viruses and bacteria that can cause infection. Second, disease processes that impede the mechanics of ventilation (e.g., emphysema and asthma) can cause severe illness or death; these processes are triggered or exacerbated by substances in the air we breathe. Finally, air is a variable and complex mixture of many substances including particulate matter and chemicals that can have a detrimental effect on lung function; moreover, many of these chemicals can be absorbed into circulating blood and cause a wide range of health problems throughout the body.

#### Learning Outcomes

After completing this module, the student will be able to:

- Describe the function of alveoli with respect to exchange of oxygen and carbon dioxide.
- Describe the role of hemoglobin in oxygen transport and the adverse effects of carbon monoxide.
- Explain how the occurrence and severity of chronic obstructive pulmonary disease (COPD) and asthma relates to environmental factors and be able to give examples of factors known to trigger asthma attacks.
- List the six criteria air pollutants, and discuss the impact of air pollution on health.
- Discuss the impact of environmental tobacco smoke on health.