Case Study: Cough That Won't Quit

Three weeks ago, 20-year-old Erica came down with symptoms typical of the common cold. She had a runny nose, fatigue, and a mild cough. Her symptoms had been starting to improve, but recently her cough has been getting worse. She is coughing up a lot of thick mucus, her throat is sore from frequent coughing, and her chest feels very congested. According to her grandmother, Erica has a “chest cold.” Erica is a smoker and wonders if her habit is making her cough worse. She decides that it is time to see a doctor.

Figure 1: (CC BY-NC 3.0; Ryan Boren; https://flic.kr/p/5qbULx)

Dr. Johnson examines Erica and asks about her symptoms and health history. She checks the level of oxygen in Erica’s blood by attaching a device called a pulse oximeter to Erica’s finger (Figure 2).
Dr. Johnson concludes that Erica has bronchitis, which is an infection that commonly occurs after a person has a cold or flu. Bronchitis is sometimes referred to as a "chest cold," so Erica's grandmother was right! Bronchitis causes inflammation and a build-up of mucus in the bronchial tubes in the chest.

![A pulse oximeter](https://bio.libretexts.org/Bookshelves/Human_Biology/Book%3A_Human_Biology_(Wakim_and_Grewal)/16%3A_Respiratory…)  
Figure 16.2: A pulse oximeter, used to measure blood oxygen levels. ([UusiAjaja](https://bio.libretexts.org/Bookshelves/Human_Biology/Book%3A_Human_Biology_(Wakim_and_Grewal)/16%3A_Respiratory…): CCO; via Wikimedia.org; Wrist oximeter.jpg)

Because bronchitis is usually caused by viruses and not bacteria, Dr. Johnson tells Erica that antibiotics are not likely to help. Instead, she recommends that Erica try to thin and remove the mucus by drinking plenty of fluids and using a humidifier or spending time in a steamy shower. She also recommends that Erica get plenty of rest.

Dr. Johnson also tells Erica some things not to do — most importantly, to not smoke while she is sick, and to try to quit smoking in the long-term. She explains that smoking can make people more susceptible to bronchitis and can hinder recovery. She also advises Erica to not take over-the-counter cough suppressant medication.

As you read this chapter on the respiratory system, you will be able to better understand what bronchitis is and why Dr. Johnson made the treatment recommendations that she did. At the end of the chapter, you will learn more about acute bronchitis, which is the type that Erica has. This information may come in handy to you personally because chances are high that you will get this common infection at some point in your life — there are millions of cases of bronchitis every year!

**Chapter Overview: Respiratory System**

In this chapter, you will learn about the respiratory system — the system that exchanges gases such as oxygen and carbon dioxide between the body and the outside air. Specifically, you will learn about:

- The process of respiration, in which oxygen moves from the outside air into the body and carbon dioxide and other waste gases move from inside the body into the outside air.
- The organs of the respiratory system, including the lungs, bronchial tubes, and the rest of the respiratory tract.
- How the respiratory tract protects itself from pathogens and other potentially harmful substances in the air.
- How the rate of breathing is regulated to maintain homeostasis of blood gases and pH.
- How ventilation, or breathing, allows us to inhale air into the body and exhale air out of the body.
- The conscious and unconscious control of breathing.
- Nasal breathing compared to mouth breathing.
- What happens when a person is drowning.

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• How gas exchange occurs between the air and blood in the alveoli of the lungs; and between the blood and cells throughout the body.
• Disorders of the respiratory system including asthma, pneumonia, chronic obstructive pulmonary disease (COPD), and lung cancer.
• The negative health effects of smoking.

As you read the chapter, think about the following questions:

1. Where are the bronchial tubes and what is their function?
2. What is the function of mucus and why can too much mucus be a bad thing?
3. Why did Dr. Johnson check Erica’s blood oxygen level?
4. Why do you think Dr. Johnson warned Erica to not take cough suppressant medications?
5. How does acute bronchitis compare to chronic bronchitis and how do they both relate to smoking?