

Respiratory depression is a complication that often follows cancer-related surgery and can result in life-threatening consequences. Oncology nurses caring for postoperative patients must monitor for respiratory complications and implement measures to prevent respiratory depression. A review of postoperative respiratory depression risk factors, clinical findings, and monitoring will be presented in this article using a case study.

#### AT A GLANCE

- A significant percentage of patients undergoing general surgeries have obstructive sleep apnea, but most members of this population remain undiagnosed at the time of surgery.
- Atelectasis, which involves failure of the lungs to expand or collapse, may be caused by general anesthesia, which creates a pulmonary shunt.
- Nurses often do not recognize changes in respiratory rates and are falsely reassured by saturation levels measured by pulse oximetry, which tends to be the method least sensitive to detecting hypoventilation.

#### KEYWORDS

respiratory depression; postoperative; respiratory rate; obstructive sleep apnea

#### DIGITAL OBJECT IDENTIFIER

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# Respiratory Depression

## A case study of a postoperative patient with cancer

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**M**ore than 20 million Americans with a history of cancer will be alive on January 1, 2026, according to estimates, with many of these survivors likely having undergone surgical treatment for the disease (Khanna, 2017). Respiratory depression is a common but life-threatening surgery-related complication that is preventable with appropriate nursing assessment and the timely implementation of interventions (Khanna, 2017). This article offers a review of postoperative respiratory depression prevention and recognition, as well as a case study that illustrates its risk factors, pathophysiology, and implications.

### Pathophysiology

The incidence of respiratory events in the postoperative period is estimated to be about 3% (Karcz & Papadakos, 2013). Perioperative respiratory depression has a 26% mortality rate within the first 30 days after surgery (Gupta et al., 2011), as well as a six times higher possibility of transfer to a skilled nursing facility (Pfeifer & Smetana, 2016). The most common postoperative pulmonary complications are atelectasis, pneumonia, respiratory depression, exacerbation of underlying lung disease, pleural effusion, and pneumothorax (Pfeifer & Smetana, 2016). General anesthesia causes atelectasis by creating a pulmonary shunt, which is evident immediately after induction. In an adult with healthy lungs, about 15% of the entire lung, as well as 20%–25% of the tissue at

lung bases, becomes atelectatic (Karcz & Papadakos, 2013).

The immediate postoperative period is critical because respiratory depression involves several mechanisms that may lead to alveolar hypoventilation and resultant hypercapnia. Weakening of the respiratory muscles occurs because of neuromuscular disease or residual neuromuscular block because of the effects of opioids, sedative hypnotics, and inhaled anesthetics used during surgery. Severe hypothyroidism can cause metabolic alkalosis, leading to hypoventilation. Pulmonary edema, obstructive airway disease, and increased inspiratory workload in patients with severe obesity result in respiratory muscle fatigue and carbon dioxide retention (Karcz & Papadakos, 2013).

Obstructive sleep apnea (OSA) is highly prevalent in the general population but remains undiagnosed in many patients (Ramsay, 2017). About 20%–25% of patients undergoing general surgeries have OSA, but most are undiagnosed at the time of surgery (Pfeifer & Smetana, 2016). Patients with OSA demonstrate a higher sensitivity to opioids that inhibit the upper respiratory muscles, leading to airway collapse and depression of the brain's respiratory center. Use of other sedating medications, particularly benzodiazepines, results in a synergistic effect with opioids to markedly impair the pharyngeal muscles in decreasing the respiratory drive (Karcz & Papadakos, 2013).

### Risk Factors

Postoperative respiratory depression can be categorized by patient-, anesthesia-,