



Improving Respiratory Culturing Practices

Key Points:

- **Pneumonia** is defined as a new lung infiltrate plus clinical evidence that the infiltrate is of infectious origin (e.g., fever, leukocytosis, purulent secretion, pleuritic chest pain, cough), and decline in oxygenation
- Respiratory cultures should not be obtained if pneumonia is not suspected
 - The presence of purulent or large amounts of sputum in isolation does not indicate pneumonia
 - The respiratory tract is not sterile; thus, respiratory cultures can grow bacteria in patients without pneumonia
- **Hospital-acquired pneumonia (HAP)** is defined as pneumonia occurring ≥ 48 hours after admission
 - Respiratory culture should be obtained if HAP is suspected
- **Ventilator-associated pneumonia (VAP)** is defined as pneumonia occurring > 48 hours after endotracheal intubation
 - Respiratory culture should be obtained if VAP is suspected
 - VAP is unlikely with bacterial burdens below the following thresholds:
 - Protected specimen brush $< 1,000$ CFU/mL
 - Bronchoscopic alveolar lavage fluid $< 10,000$ CFU/mL
 - Endotracheal aspirate $< 100,000$ CFU/mL
- **Aspiration pneumonitis** is an abrupt chemical injury caused by inhalation of gastric contents
 - Patients often have a rapid decline in respiratory status followed by improvement within 48 hours
 - Chest-x ray often shows bilateral infiltrates
 - Antibiotics do not prevent progression to bacterial pneumonia which does not always occur following an aspiration event
 - Respiratory culture should be considered if purulent sputum is being produced, or if antibiotic treatment is initiated in a hemodynamically unstable patient
 - Most patients do not develop *pneumonia* and prophylactic antibiotics for cases of aspiration pneumonitis do not provide a clinical benefit
- **Aspiration pneumonia** can be due to aspiration of small amounts of oropharyngeal secretions or due to large-volume secretions (e.g., vomit)
- Several respiratory conditions may mimic bacterial pneumonia—viral pneumonia, mucus plugging, pulmonary edema, pulmonary embolism
 - Respiratory cultures and antibiotics are not needed in patients with these conditions

How Can Nurses Help Reduce Unnecessary Antibiotics Driven By Respiratory Cultures?

- Ensure that patients have an appropriate indication before obtaining a respiratory culture (see [algorithm](#))

References

- Dragan V. et al. Prophylactic Antimicrobial Therapy for Acute Aspiration Pneumonitis, *Clinical Infectious Diseases*, Volume 67, Issue 4, 15 August 2018, Pages 513–518.
- Mandell, Lionel A. Aspiration Pneumonia, *New England Journal of Medicine*, February 14, 2019 380(7):651.
- Kalil A. C., et al. Management of Adults With Hospital-acquired and Ventilator-associated Pneumonia: 2016 Clinical Practice Guidelines by the Infectious Diseases Society of America and the American Thoracic Society, *Clinical Infectious Diseases*, Volume 63, Issue 5, 1 September 2016, Pages e61–e111.