Alert
Don appropriate personal protective equipment (PPE) based on the patient’s signs and symptoms and indications for isolation precautions.

Bronchospasm or laryngospasm, as a result of suctioning, can be severe and prolonged, and, in some cases, can be life-threatening without intervention.

Overview
Sputum is produced by cells that line the respiratory tract. Although production is minimal in the healthy patient, disease processes can increase the amount or change the character of sputum. Examination of sputum aids in the diagnosis and treatment of many conditions such as bronchitis, bronchiectasis, tuberculosis (TB), pneumonia, and pulmonary abscess, or lung cancer. In many cases, suctioning is indicated to collect sputum from a patient who cannot spontaneously produce a sample for laboratory analysis. Suctioning may provoke violent coughing, induce vomiting, and result in aspiration of stomach contents. Suctioning may also induce constriction of the pharyngeal, laryngeal, and bronchial muscles. In addition, suctioning may cause hypoxemia or vagal overload, causing cardiopulmonary compromise and an increase in intracranial pressure.

Sputum for cytology, culture and sensitivity, and acid-fast bacilli (AFB) are three major types of sputum specimens. Cytologic or cellular examination of sputum may identify aberrant cells or cancer. Sputum collected for culture and sensitivity testing can be used to identify specific microorganisms and determine which antibiotics are the most sensitive. The AFB smear is used to support a diagnosis of TB. A definitive diagnosis of TB also requires a sputum culture and sensitivity. Regardless of the test ordered, a sputum specimen should be collected first thing in the morning due to a greater accumulation of bronchial secretions overnight.

Education
- Provide developmentally and culturally appropriate education based on the desire for knowledge, readiness to learn, and overall neurologic and psychosocial state.
- Explain to the patient, family, and caregivers how and why the specimen is being collected.
- Explain to the patient, family, and caregivers the need to obtain a specimen that is not contaminated with saliva or oropharyngeal secretions.
- Explain to the patient, family, and caregivers the difference between secretions and sputum.
- Instruct the patient not to clean his or her teeth or use mouthwash before collecting an AFB specimen because this may kill the bacteria.
- Demonstrate the proper splinting technique for a postoperative patient or a patient with a weak cough.
- If an aerosol treatment is indicated, explain the purpose of the procedure, and inform the patient, family, and caregivers that the aerosol will stimulate coughing and sputum expectoration.
- Encourage questions and answer them as they arise.
Specimen Collection: Sputum (Home Health Care) - CE

PROCEDURE
1. Perform hand hygiene and don gloves and appropriate PPE based on the patient’s signs and symptoms and indications for isolation precautions. Take airborne precautions when caring for a patient who is suspected of having TB or other airborne transmissible diseases.²
2. Introduce yourself to the patient, family, and caregivers.
3. Verify the correct patient using two identifiers.
4. Explain the procedure to the patient, family, and caregivers and ensure that the patient agrees to treatment.
5. Verify the practitioner’s order and assess the patient for pain.
6. Prepare an area in a clean, convenient location and assemble the necessary supplies.
7. Check the practitioner’s orders for the type of sputum analysis and specifications (e.g., amount of sputum, number of specimens, time of collection, method to obtain).
8. Assess the patient’s level of understanding of the procedure and its purpose.
9. Determine when the patient last ate a meal or had a tube feeding.
   Rationale: Suctioning or coughing up secretions can trigger the gag reflex. If a patient has recently eaten, this may also trigger vomiting.
10. Assess the patient’s respiratory status, including respiratory rate, depth, pattern, and color of mucous membranes.
11. Determine the patient’s ability to assist with the collection of the specimen.
12. Provide privacy for the patient.
13. Position the patient in the high-Fowler or semi-Fowler position for specimen collection.
   Rationale: The high-Fowler or semi-Fowler position promotes full lung expansion and facilitates the ability to cough.
14. Instruct a patient who has a surgical incision or localized area of discomfort to place his or her hands firmly over the affected area or to place a pillow over the area.

Sputum Collection Using the Coughing and Expectorating Method
1. If not already done, perform hand hygiene and don gloves.
2. Provide the patient with the appropriate specimen container. Instruct him or her not to touch the inside of the container.
   Rationale: Touching the inside of the container may compromise the laboratory test results.
3. Instruct the patient to take a slow deep breath and to cough after a full inhalation.
   Rationale: Expectorant must come from the lungs. Saliva is not sputum.³
4. Instruct the patient to expectorate sputum directly into the specimen container.
5. Instruct the patient to repeat coughing until a sufficient quantity, a minimum of 5 ml of sputum, is collected.³
6. Secure the top on the specimen container tightly.
7. Wipe any sputum present on the outside of the container with a disinfectant wipe.
Specimen Collection: Sputum (Home Health Care) - CE

Ensure that the container is tightly closed before wiping to prevent contaminating the specimen.

8. Offer the patient tissues after he or she expectorates. Dispose of the tissues in an emesis basin or appropriate waste receptacle.
9. Offer the patient mouth care, if desired.
10. In the presence of the patient, label the specimen per the organization’s practice.
11. Place the labeled specimen in a biohazard bag and transport it to the laboratory immediately per the organization’s practice.
12. Observe the character of sputum, noting the color, consistency, volume, viscosity, and presence of blood.

Rationale: Abnormal sputum characteristics may indicate disease entities.

Report unusual sputum characteristics or changes in the characteristics of the sputum to the practitioner.

13. Refer to the laboratory reports for the test results.
   a. Report abnormal findings to the practitioner.
   b. Initiate appropriate isolation techniques if an AFB sputum culture is positive.

Rationale: An AFB culture indicates whether abnormal cells or microorganisms are in sputum.

14. Evaluate the patient’s ability to describe and demonstrate the sputum collection process.

Rationale: Evaluating the patient’s ability to describe and demonstrate the process reinforces his or her ability to collect future expectorated specimens.

15. Assess pain, treat if necessary, and reassess.
16. Discard or store supplies, remove PPE, and perform hand hygiene.
17. Document the procedure in the patient’s record.

Sputum Collection Using Suctioning
1. Prepare the suction machine or device, if available, and ensure that the suction source is functioning properly.
2. Connect the suction tubing to the adapter on the sputum trap.
3. If using a sleeved suction catheter, remove the suction tubing from the end of the catheter and connect it to the sputum trap.

Rationale: Connecting the suction tubing to the sputum trap establishes suction that passes through the sputum trap to aspirate a specimen.

4. If not already done, perform hand hygiene and don gloves. Don sterile gloves and eye protection (if not already done) if a regular sterile suction catheter will be used.

Rationale: The tracheobronchial tree is a sterile body cavity. Sterile gloves allow for manipulating the suction catheter without contaminating it.
Sterile gloves or eye protection is not required if a sleeved suction catheter is used.

5. Connect the regular sterile suction catheter or the end of the sleeved suction catheter to the rubber tubing on the sputum trap.

   Rationale: Connecting the sterile suction catheter or the sleeved suction catheter to the rubber tubing on the sputum trap allows aspirated sputum to go directly to the trap instead of to the suction tubing.

6. Apply a water-soluble lubricant to the end of the suction catheter.
7. Instruct the patient to breathe normally during suctioning to prevent hyperventilation. Explain to the patient that he or she may cough.
8. Gently insert the tip of the suction catheter through the nasopharynx, endotracheal tube, or tracheostomy tube without applying suction.

   Rationale: Inserting the tip of the suction catheter without applying suction minimizes hypoxemia and trauma to the airway as the catheter is inserted.

9. Advance the catheter into the trachea gently and quickly.

   Rationale: Entering the larynx and trachea triggers the cough reflex.

10. Apply suction by placing the thumb of the nondominant hand over the suction port of the regular suction catheter or by depressing the suction button of the sleeved suction catheter for 10 to 15 seconds as the patient coughs. Collect 5 to 10 ml of sputum.
11. Apply suction only while withdrawing the catheter from the insertion site. Maintain sterility when suctioning the endotracheal or tracheostomy tube site.

   Limit the duration of each suction pass to less than 15 seconds and limit the number of passes to a maximum of three to help minimize hypoxemia, airway trauma, and cardiac arrhythmias.

   If the patient becomes hypoxic during the procedure, discontinue the procedure immediately and provide supplemental oxygen.

12. Observe and monitor the patient’s respiratory status throughout the procedure, especially during suctioning.

   Rationale: Excessive coughing or prolonged suctioning can alter the patient’s respiratory pattern and cause hypoxia.

13. Observe the patient for anxiety or discomfort.

   Rationale: The procedure can be uncomfortable. Anxiety may develop if the patient becomes short of breath.

14. Release the suction and withdraw the catheter.
Specimen Collection: Sputum (Home Health Care) - CE

Rationale: Suction can damage mucosa if applied during withdrawal.

15. Turn off the suction source.
16. Evaluate the patient immediately after the procedure. Note any dyspnea or signs of hypoxia.
17. Detach the catheter from the specimen trap.
   a. Dispose of the catheter in an appropriate receptacle if using a regular suction catheter.
   b. Reconnect the suction tubing to the end of the catheter if using a sleeved suction catheter.

18. Detach the suction tubing and connect the rubber tubing on the sputum trap to the plastic adapter.
19. Wipe off any sputum present on the outside of the sputum trap with a disinfectant wipe.

   **Ensure that the sputum trap is tightly sealed before wiping to prevent contaminating the specimen.**

20. Offer the patient tissues after suctioning. Dispose of the tissues in the emesis basin or appropriate waste receptacle.
21. Offer the patient mouth care, if desired.
22. In the presence of the patient, label the specimen per the organization’s practice.¹
23. Place the labeled specimen in a biohazard bag and transport it to the laboratory immediately per the organization’s practice.
24. Observe the character of sputum, noting the color, consistency, volume, viscosity, and presence of blood.

   Rationale: Abnormal sputum characteristics may indicate disease entities.

   **Report unusual sputum characteristics or changes in the characteristics of the sputum to the practitioner.**

25. Refer to the laboratory reports for the test results.
   a. Report abnormal findings to the practitioner.
   b. Initiate appropriate isolation techniques if an AFB sputum culture is positive.

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26. Evaluate the patient’s ability to describe and demonstrate the sputum collection process.

   Rationale: Evaluating the patient’s ability to describe and demonstrate the process reinforces his or her ability to collect future expectorated specimens.

27. Assess pain, treat if necessary, and reassess.
28. Discard or store supplies, remove PPE, and perform hand hygiene.
Specimen Collection: Sputum (Home Health Care) - CE


EXPECTED OUTCOMES
- Patient’s respirations are the same rate and character as before the procedure.
- Patient is relaxed and able to answer questions (if no artificial airway is present).
- Sputum is not contaminated by saliva or oropharyngeal flora.
- Laboratory test results do not reveal abnormal cells or microorganisms.
- Patient maintains adequate oxygen saturation levels.
- Patient tolerates procedure without pain or discomfort.

UNEXPECTED OUTCOMES
- Patient becomes hypoxic.
- Patient has increased respiratory rate and effort.
- Patient feels short of breath.
- Oxygen saturation levels drop after procedure and do not improve after procedure is completed.
- Patient remains anxious or complains of discomfort from the suction catheter.
- Inadequate amount of sputum is collected.
- Specimen contains blood, pathogenic organisms, or abnormal cells.
- Patient complains of pain when coughing to produce sputum.

DOCUMENTATION
- Education
- Patient’s progress toward goals
- Unexpected outcomes and related interventions
- Assessment of pain, treatment if necessary, and reassessment
- Method used to obtain specimen
- Type of test ordered
- Date and time of collection
- Characteristics of sputum specimen
- Patient’s tolerance of procedure

REFERENCES
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Elsevier Skills Levels of Evidence
- Level I - Systematic review of all relevant randomized controlled trials
- Level II - At least one well-designed randomized controlled trial
- Level III - Well-designed controlled trials without randomization
- Level IV - Well-designed case-controlled or cohort studies
- Level V - Descriptive or qualitative studies
- Level VI - Single descriptive or qualitative study
- Level VII - Authority opinion or expert committee reports

Supplies
Ensure that all necessary supplies and durable medical equipment are available.

- Appropriate-size sterile suction catheter or an existing sleeved suction catheter
- Patient identification labels, if available
- Permanent marker for labeling in the absence of patient labels
- Completed laboratory requisition, including patient identification, date, time, name of test, and source of culture
- Disinfectant wipes
- In-line specimen container, sputum trap, or sterile specimen cup
- Oxygen therapy equipment
- Gloves, sterile gloves, eye protection (if using a regular sterile suction catheter), appropriate PPE as indicated per isolation precautions
- Biohazard bag(s)
- Suction device (portable), if available
- Water-soluble lubricant
- Supplies for mouth care

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