

## APPENDIX F SPUTUM INDUCTION

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Sputum induction is used to obtain sputum from clients who are unable to spontaneously expectorate a specimen. The procedure uses sterile water or hypertonic saline to irritate the airway, increase secretions, promote coughing, and produce a specimen.

**Appropriate precautions must be taken to prevent TB transmission from sputum induction.**

**Specifically:**

- Sputum induction should only be done in areas that meet airborne infection isolation room (AIIR) requirements. AIIR are available in all Yukon hospital locations (Dawson City Hospital, Watson Lake Hospital, Whitehorse General Hospital). Refer to the [Canadian Tuberculosis Standards \(2014\)](#) for information on characteristics of AIIR.

Within Yukon, it is recognized that some rural communities do not have access to AIIR. In consultation with YCDC TB Control, the following should be considered:

- When the client is on existing home isolation, sputum induction can occur within the home environment using airborne precautions.
- When outdoor temperature permits, use natural ventilation (collect the specimen outside or in a room with the windows open) to reduce the concentration of TB bacteria in the area where the specimen is/was produced.

If facility-based collection is required in a community where AIIR is not available:

- Clients should be scheduled at the end of the day or after regular hours to minimize exposure to others.
- Clients should be provided with masks (surgical/procedure type) before arrival or immediately on reception to be worn throughout the visit except while undergoing the sputum induction procedure.
- Specimens should be collected in rooms with the doors closed, away from other people.

- Health care providers should wear fit-tested and seal-checked disposable N95 particulate respirators while providing care to clients with suspected or confirmed infectious TB disease.
- While the procedure is underway, health care providers should separate themselves from the area where the sputum induction is being done, provided the client can be monitored safely from outside the room (e.g., through a view window in the door).

### Step by Step Guide to Performing Sputum Induction<sup>1</sup>

Procedure	Key Points
<b>Wear a fit-tested and seal-checked disposable N95 particulate respirator when providing care for clients with suspected or confirmed infectious TB disease</b>	<ul style="list-style-type: none"> <li>• Prevent exposure to TB bacteria from clients with suspected or confirmed infectious TB disease</li> </ul>
<b>Explain the procedure</b>	<ul style="list-style-type: none"> <li>• Purpose of procedure</li> <li>• When results will be available</li> <li>• How to notify nurse if assistance is needed or when procedure is completed</li> <li>• Importance of staying in the room until coughing has stopped</li> <li>• Importance of putting on a surgical/procedure-type mask before leaving room and exiting the facility</li> </ul>
<b>Explain how to collect the specimen</b>	<p><b>Client instructions:</b></p> <ul style="list-style-type: none"> <li>• Rinse mouth or drink water prior to beginning procedure</li> <li>• Cough vigorously if spontaneous coughing does not occur</li> <li>• Cover mouth with tissue when coughing, except to expectorate into the specimen container</li> <li>• Open the specimen container and expectorate into it, taking care not to touch the inside the container or the inside of the cap</li> <li>• Continue until at least 5 mL of sputum has been collected</li> <li>• Close the specimen container tightly and place it in the plastic bag</li> </ul>

Procedure	Key Points
<p><b>Prepare the nebulizer, following manufacturer's instructions</b></p>	<ul style="list-style-type: none"> <li>• Aseptic technique must be used when placing sterile water or hypertonic saline in the nebulizer chamber. While some ultrasonic devices have a tap water reservoir, only sterile solutions should be placed in the cups or nebulizers that produce the mist inhaled by clients.</li> <li>• Add approximately 3 mL of sterile Sodium Chloride 3% solution to the nebulizer medication cup</li> <li>• Test nebulizer to ensure that adequate mist is produced</li> </ul>
<p><b>Ensure necessary equipment is present and client understands all instructions</b></p>	<ul style="list-style-type: none"> <li>• Turn compressor on</li> </ul>
<p><b>Client must be observed at all times during the procedure</b></p>	<ul style="list-style-type: none"> <li>• Watch carefully for signs of respiratory distress</li> <li>• Instruct client to breathe in and out as per normal</li> </ul>
<p><b>Collection and submission of specimens for TB testing</b></p>	<ul style="list-style-type: none"> <li>• Ensure the specimen container is labeled properly (see Appendix E for labeling requirements)</li> <li>• Induced sputum specimens can appear thinner and more watery than spontaneously expectorated specimens. <b>To avoid having the specimen rejected by the laboratory, ensure the specimen is identified as “<u>induced sputum</u>” on the requisition.</b></li> </ul>
<p><b>Ensure the client remains in the room until s/he has stopped coughing</b></p>	<ul style="list-style-type: none"> <li>• Contain infectious particles in the room</li> </ul> <p><b>NOTE: If it becomes necessary for client to leave room before coughing has stopped, ensure s/he is wearing a surgical/procedure-type mask and exits the facility.</b></p>
<p><b>Ensure that door is closed after client has completed the procedure and left the room</b></p>	<ul style="list-style-type: none"> <li>• Prevent contaminated air from escaping into the corridor</li> </ul>
<p><b>Place a sign on the door indicating the door is to be kept closed, and when the room will be safe to enter (see Appendix K-6)</b></p>	<ul style="list-style-type: none"> <li>• Adequate time must be allowed for removal of at least 99% of airborne contaminants. This time period will vary, depending on the amount of air exhausted from the room, room air mixing, and the size of the room (see <a href="#">Table F-1</a>).</li> </ul>
<p><b>Prepare room for next client</b></p>	<ul style="list-style-type: none"> <li>• Wait required time for room to clear of infectious airborne particles or wear fit-tested and seal-checked, disposable N-95 particulate respirator when entering the room</li> <li>• Remove and discard disposable items according to facility policy</li> <li>• Clean area according to facility policy</li> </ul>

**Table F-1, Time needed (by number of air changes per hour) to remove airborne microorganisms after generation of infectious droplet nuclei has ceased\*<sup>2</sup>**

Air changes per hour	Minutes required for removal of airborne microorganisms	
	99% removal	99.9% removal
2	138	207
4	69	104
6	46	69
12	23	35
15	18	28
20	14	21
50	6	8

\*This table was adapted from Centers for Disease Control and Prevention. Guidelines for preventing the transmission of Mycobacterium tuberculosis in health-care settings. MMWR 2005;54:1-142.

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## REFERENCES

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1. Adapted from Curry International Tuberculosis Center, 2011: *Tuberculosis Infection Control: A Practical Manual for Preventing TB*, [73-86]. Available from: [www.currytbcenter.ucsf.edu](http://www.currytbcenter.ucsf.edu)
2. Ogunremi T, Menzies D, Embil J. Prevention and control of tuberculosis transmission in health care and other settings. In: Menzies D, ed. *Canadian Tuberculosis Standards* (7th edition). Canada: Canadian Lung Association, 2014;361-404.