Guidelines for Sputum Collection in Tuberculosis Patients

How is Diagnosis of Tuberculosis Confirmed?
In all instances, individuals identified as tuberculosis patients must have an examination of their sputum performed to determine whether or not they are infectious cases of tuberculosis, prior to the commencement of their treatment.

The examination consists of microscopic examination of the sputum specimen (smear microscopy). Smears may be prepared directly from clinical specimens or from concentrated preparations. The acid fast staining procedure depends on the ability of mycobacteria to retain dye when treated with mineral acid or an acid alcohol solution. Two procedures are commonly used for acid fast staining: the carbolufschin methods, which include the Ziel-Neelsen and Kinyoun methods, and a fluorochrome procedure using auramine-O or auramine-rhodamine dyes. If micro-organisms (commonly referred to as acid-fast bacilli or AFB) are detected by this method then the patient is said to have smear positive tuberculosis. It is important to carry out smear microscopy because it correctly and efficiently identifies the cases that are infectious and therefore have the highest priority for care.

From whom should sputum be collected?
From all patients (adults and older children) suspected of having pulmonary or laryngeal tuberculosis, patients diagnosed with extra-pulmonary TB who are coughing or who have an abnormal chest x-ray, patients being evaluated for a positive TB skin test who are coughing or who have an abnormal chest x-ray.

When to do Sputum Examination?
Two specimens are taken on three separate occasions during the course of treatment of patients with Pulmonary Tuberculosis.

Pre-treatment
When Pulmonary Tuberculosis is first suspected, send 2 specimens on consecutive days for TB microscopy for both new and re-treatment cases. For re-treatment cases, a sputum sample for culture and sensitivity should also be taken.

During treatment
Two specimens should be sent for microscopy just before the end of intensive phase of treatment (at 2 months of treatment for new patients and at 3 months for re-treatment patients)

During TB treatment, all pulmonary TB patients should be monitored by sputum smear microscopy. Sputum for culture and susceptibility testing is only required if patient still remains sputum positive at the end of intensive phase.

At the end of treatment
Two specimens should be sent after 5 months of treatment for new patients and 7 months for re-treatment cases.

Sputum collection
Specimens should be collected in either a well-ventilated area or in a sputum collection booth that has a negative pressure ventilation system.

Suitable specimen containers must be clean, sterile, wide-mouthed, leak proof and disposable plastic containers of at least a 50 ml capacity.

Health care workers collecting the sputum, regardless of the setting, must observe the appropriate infection control precautions. The healthcare worker should wear an N-95 disposable respirator during sputum collection and disposable gloves.

Sputum should be collected under direct observation, at least for the first time. This is to insure that the patient is being properly coached, as well as, insuring that uncooperative patients are producing their own sputum for examination.

A good specimen should be approximately 4–5 ml. It is usually thick and mucoid. It may be fluid and contain pieces of purulent material. Colour varies from opaque white to green. Bloody specimens will appear reddish or brown. Clear saliva or nasal discharge is not suitable as a TB specimen.

For patients unable to bring up sputum, deep coughing may be induced by inhalation of an aerosol of warm, hypertonic (5%/15%) saline.

At least two sputum specimens should be taken from a TB suspect.

First specimen: At the first interview with the patient a ‘spot specimen’ is collected. This specimen is obtained immediately after the patient undergoes a bout of coughing and the back of the throat is cleared.

Second specimen: The patient is then given a sputum container for the collection of an early morning specimen, usually the following day.

This is an extremely important procedure:
- The person must rise out their mouth with water.
- Explain the steps in a slow and concise manner.
- Ask the patient to be very careful and direct the sputum into the container so as not to contaminate it.
- Demonstrate a deep cough from the bottom of the chest, beginning with deep breathing.
- Supervise the collection, but do not stand in front of the patient.
- Give the patient the container, without the specimen.
- Be ready to replace the lid on the container immediately.
- Once specimen is in the container, make sure the lid is securely closed by pressing down on the centre of the lid down until a click is heard.
- Wash your hands after handling the sputum specimen.

Remember! The person must be encouraged to produce a specimen even if this resembles saliva.

Labelling:
Correct labelling is essential as it will save time and prevent errors. Label the container first, very clearly with:
- Name of clinic/hospital.
- Name of patient and clinic/hospital number.
- Indicate whether the specimen is pre-treatment (suspect), follow-up (2–3 months) or end-of-treatment specimen (5–7 months).
- Write clear instructions regarding what investigations are required.
- Write the appearance of the sputum (e.g. mucoid, lumpy, green, and offensive, etc).
- Date the specimen clearly and time of collection of the specimen.

Sputum storage:
- Place the sputum bottle in a plastic bag to prevent contamination.
- Store sputum specimen in a fridge if transport is not immediately available. Do not store in a freezer.
- Send the specimen as soon as possible.
- Record the date on which the specimen has been sent to the laboratory in the suspect register.

Transportation of sputum specimens:
- Specimens should be transported to the laboratory in a cooler bag. High temperatures during transit will kill bacilli.
- During transportation, specimens should be kept out of direct sunlight.
- Explain to the driver the reasons for transporting the specimens, thereby ensuring that specimens go directly to the laboratory.
- Sputum result turn around time (TAT) refers to the duration of time from the taking of a specimen from the patient to the receiving of the results at the health facility.

Sputum Results:
The results of the laboratory reports are subject at times to human and material error. Some of the errors include, clerical errors, reagents problems, bad quality of specimens, process errors and lack of quality control. A laboratory result that does not tie up with other clinical information must be interpreted with care. The number of bacilli (AFB) seen in a smear reflects the patient’s infectivity.

Remember the following:
For public health planning purposes, the degree of infectiousness is determined by the presence of AFB in the sputum, not in bronchial washings, tracheal aspirates, or other pulmonary specimens.

References: