World Health Organization

INTERIM GUIDANCE

How to safely collect sputum samples from patients suspected to be infected with pneumonic plague

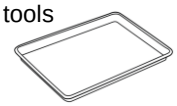
September 2016

Step 1: Before entering patient room, assemble all equipment

This document will focus only on the collection of sputum. Note, that ALL suspected plague patients should have the following samples collected:

- ❑ **Sputum**
- ❑ Whole blood (stored in haemoculture medium)
- ❑ Serum

Step 1a: Assemble equipment for sputum sample

- ❑ Plastic container with screw top lid 
- ❑ Sterile swab 
- ❑ Cary-Blair transport medium 
- ❑ Durable marker for writing on laboratory samples 
- ❑ Tray for assembling sputum collection tools 
- ❑ Clean water for oral rinse 
- ❑ Plague Rapid Diagnostic Test (if available) 

Step 1b: Assemble equipment for preventing infections

For hand hygiene use

- ❑ Alcohol-based handrub **OR**
- ❑ Clean running water, soap and disposable (paper) towel



Personal Protective Equipment (PPE)

- ❑ Several pairs of disposable gloves (non-sterile, ambidextrous, single layer)
  - One pair for sputum collection
  - Additional pairs as a replacement if they become damaged or contaminated

- ❑ Long-sleeved, cuffed gowns

- ❑ Footwear: closed-toe shoes with puncture resistant soles
- ❑ Face protection: face mask + [face shield **OR** goggles]

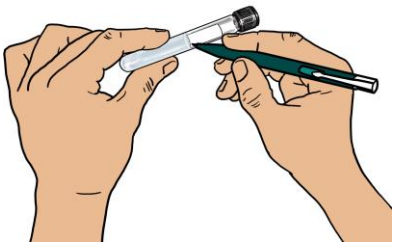
Waste management

- ❑ Two leak-proof infectious waste bags
  - one for disposable material (destruction)
  - one for reusable materials (disinfection)

NOTE: In case of aerosol generating procedure, use a fit-tested N95 face mask or equivalent face protection. Countries with high TB prevalence, always use N95 face mask or equivalent face protection

Step 1: Before entering patient room, assemble all equipment

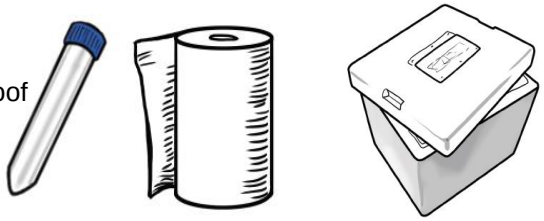
Step 1c: Fill out patient documentation



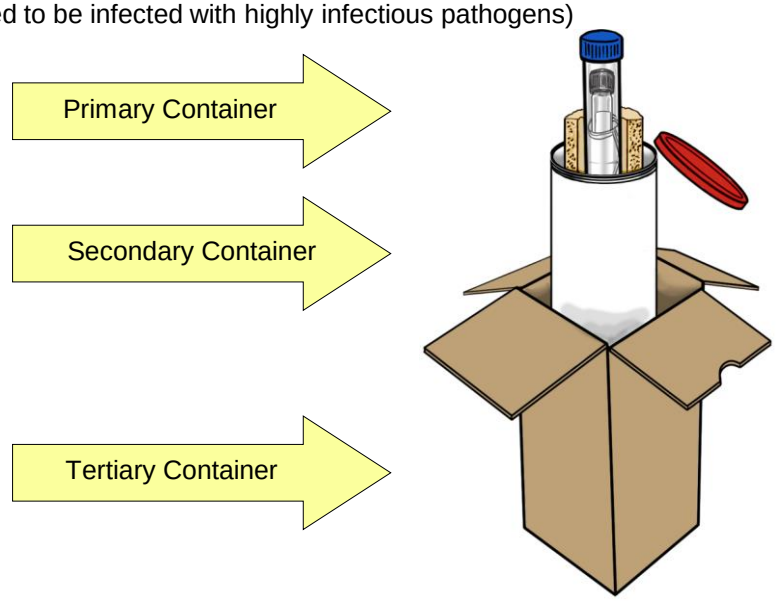
- ❑ **Label Cary-Blair transport medium tube and the plastic container with screw top lid** with date of collection, patient name, and his/her identifier number.
- ❑ **Complete the necessary laboratory form and epidemiological questionnaire.**
- ❑ **If several patients have to be sampled in the same place or during the same investigation, create a line list.** One patient per line. The list should include: patient name, identifier number, sex, age (birth date), clinical information: symptoms, date of onset, date specimen was collected, type of sample taken.

Step 1d: Assemble equipment for packaging of samples

- ❑ Plastic leak-proof packaging container
- ❑ Disposable (paper) towels
- ❑ 0.5% Chlorine solution for disinfecting plastic leak-proof packaging container
- ❑ Cooler or cold box, if sample requires refrigeration



For the shipment of samples to the National Reference Laboratory follow sample shipment packaging requirements (Follow WHO documents about how to safely ship human samples from patients suspected to be infected with highly infectious pathogens)



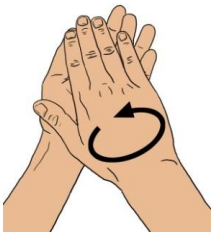
Important: A designated Assistant wearing gloves should be available to help you. This person should stand outside the patient room. He/She will help you prepare the sample for transport. He/She will assist you with putting on the personal protective equipment. He/She will provide any additional equipment you may need. He/She will monitor you while you remove the personal protective equipment.

Step 2: Put on all personal protective equipment (PPE)

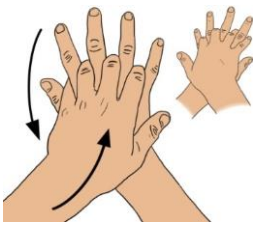
DO NOT ENTER THE PATIENT AREA IF YOU DO NOT HAVE ALL PROTECTIVE GEAR ON
REMOVE ALL PERSONAL ITEMS (jewellery, watches, mobile phones, pens, etc.)

Step 2a: Perform hand hygiene. Duration of the entire procedure: **40-60 sec** if handwashing with soap and water; **20-30 sec** if handrubbing with an alcohol-based solution.

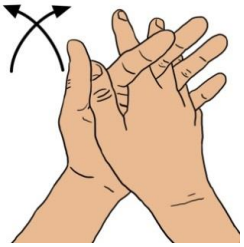
Wet hands with water and enough soap to cover all hand surfaces



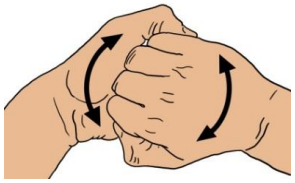
Rub hands, palm to palm



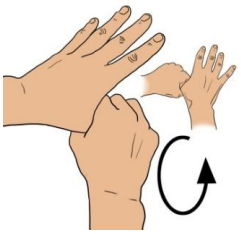
Right palm over left dorsum with interlaced fingers and vice versa



Palm to palm with fingers interlaced



Back of fingers to opposing palms with fingers interlocked

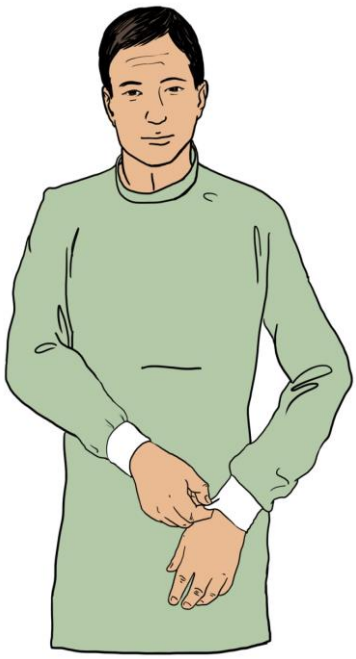


Rotational rubbing of left thumb clasped in right palm and vice versa

Rinse hands with water

Dry hands thoroughly with single use towel

Step 2b: Put on a gown



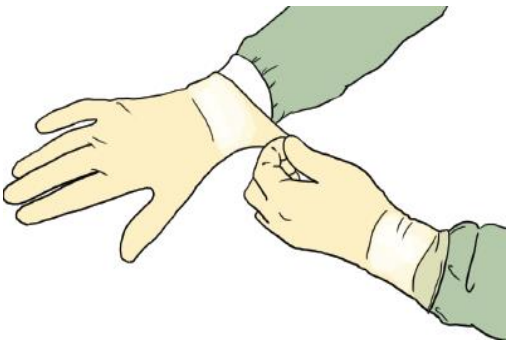
Step 2c: Put on face protection

Put on a medical mask

Put on eye protection (goggles or face shield)

OR

Step 2d: Put on gloves (over gown cuffs)



Step 2e: You are ready to enter the patient room

Step 3: Set up station to collect sputum from patient
(at least 2 metres away from all people in an isolated area)

Step 3a: Prepare room

- ✓ Bring all equipment for sputum collection and waste management into the patient room as you enter
- ✓ Set up infectious waste bags for use
- ✓ Set up sputum collection equipment in a place that is easy to access

Destruction

Disinfection

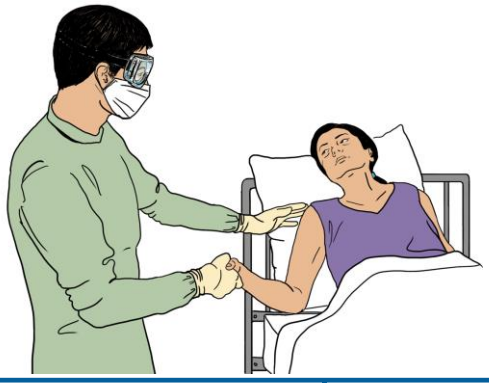
Step 3b: Determine whether there is wind or air blowing in the room

- ✓ If there is a wind, position sputum collection area so patient has the wind blowing on his/her back.
- ✓ If there is a fan, be sure to stop it.
- ✓ You will be standing behind the patient when collecting the sample.

Step 4: Collect sputum sample from patient

Step 4a: Identify and prepare the patient

- ✓ Introduce yourself to the patient
- ✓ Make sure that this is the correct patient from whom you wish to take the sputum sample
- ✓ explain what you will do, and why the sputum sample is necessary



Step 4b: Show patient the plastic container and describe what sputum is and what it looks like:

- ✓ Explain to patient that they should aim to produce enough sputum to fill container to one spoon full.
- ✓ It is okay if patient does not produce enough sputum as long as the sample matches the sputum description.
- ✓ Sputum is thick and mucoid and comes from the lungs.
- ✓ The colour is white to green or bloody.
- ✓ Sputum is NOT saliva or nasal secretions which are runny and clear.

Step 4c: Ask patient to rinse mouth out with clean water

- ✓ This will reduce food/bacteria in the mouth.

Step 4d: Give the labelled container to patient

- ✓ Tell patient not to touch inside of the container at any time.
- ✓ Maintain sterility of container and lid

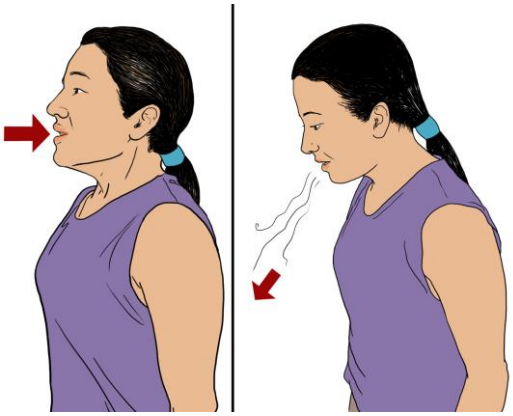
Step 4e: Position patient at sputum station and stand behind the patient

- ✓ Make sure the air stream (fan, air conditioner) is behind your back so you do not become exposed when the patient coughs.

Step 4: Collect sputum sample from patient

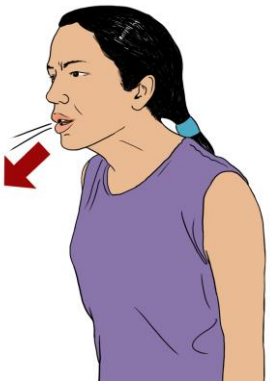
Step 4f: Tell patient to take a deep breath and hold for a few seconds then breathe out slowly

✓ Repeat the process 3 times



Step 4g: Tell patient to blow out hard during their 3rd blow

✓ It may be helpful to count the blows for the patient.



Step 4h: Ask patient to lift container close to his/her mouth and blow out hard once more

✓ The container should not touch the mouth.

✓ This motion will bring sputum from the lungs.

Step 4i: Tell patient to cough directly into plastic container

Step 4j: Compare sputum sample to description in 4b

✓ If the sputum sample looks similar to description in 4b, tell patient to return to resting position.

✓ If the sputum sample does not match description in 4b, obtain a new container from designated assistant outside of patient room, repeat steps 4c to 4i.

Step 4k: Put items that have body fluid on them into the infectious waste bag

✓ Place fluid from mouth rinsing station in infectious waste bag

Quick tips:

✓ **Ensure that the patient is undergoing prompt treatment without waiting for lab results and that clinical management is appropriate according to plague guidelines.**

✓ **Isolate patient with suspected pneumonic plague from other sick patients.**

✓ **Verify that all healthcare workers are wearing appropriate PPE when coming within two metres of a suspected pneumonic plague patient (refer to Step 2)**

Step 5: Prepare sample for Rapid Diagnostic Test Kit (RDT) analysis or transportation to the National Reference Laboratory

Step 5a: If plague RDT kit is available, perform diagnostic analysis as per RDT manufacturer's instructions

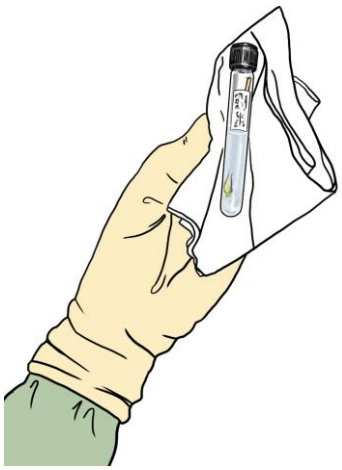
- ✓ If no RDT kit is available, continue to step 5b and prepare sample for shipment.

Step 5b: Transfer sputum from plastic container to the Cary-Blair transport medium tube using swab

Step 5c: Once sputum is on the swab, push the swab into the Cary-Blair transport medium tube

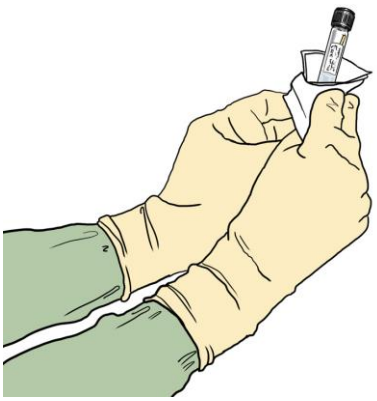
- ✓ Leave swab in the Cary-Blair medium.
- ✓ Cut or break off the remaining swab that extends from the Cary-Blair medium tube
- ✓ Tightly close the top of Cary-Blair medium tube
- ✓ Close plastic container with remaining sputum and throw into infectious waste bag.

Step 5d: Wipe the outside of the Cary-Blair transport medium tube with disposable paper towel to remove all visible sputum.



Step 5e: Place used plastic container and all items that came into contact with the patient and sputum into the infectious waste bag for destruction

Step 5f: Protect the sample from breaking or leaking during transport by wrapping the tube in a paper towel



Step 5: Prepare sample for Rapid Diagnostic Test Kit (RDT) analysis or transportation to the National Reference Laboratory

Step 5g: Ask the designated assistant to approach the patient room, without entering

- ✓ This person should have gloves on
- ✓ This person should come close to you holding the open plastic leak-proof packaging container.
- ✓ This person should **not** enter the patient room

Step 5h: The person who has collected the sputum sample should put the wrapped tube of sputum into the plastic leak-proof packaging container

- ✓ Be careful not to touch the leak-proof plastic tube with your gloves while transferring the wrapped tube of sputum to the leak-proof plastic tube

Step 5i: Have the gloved assistant tightly close the top of the plastic leak-proof packaging container

- ✓ Disinfect the outer side of the plastic leak-proof packaging container with 0.5% chlorine solution

Step 5j: The assistant removes gloves and performs hand hygiene

Note: The sample is now ready for shipment to the National Reference Laboratory. Follow sample shipment packaging requirements for infectious substances.

- ❑ Store at room temperature for up to 24 hours. If you need to store the sample for longer periods before shipping, store between 4-8 Celsius.
- ❑ Do not freeze bacteria samples.
- ❑ Haemoculture and sputum samples can be packaged and shipped together.

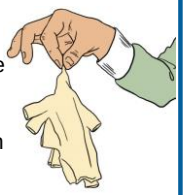
Step 6: Remove Personal Protective Equipment (PPE)

Step 6a: Remove the gloves

1. Hold the outer edge of the first glove and peel it off

2. Hold the first glove in the gloved hand and drag a bare finger under the second glove

3. Remove second glove from the inside, creating a "bag" for both gloves and put in the infectious waste bag for disposal



Step 6b: Perform hand hygiene

- ✓ Alcohol-based handrub solution (20-30 sec) **OR**
- ✓ Soap and water (40-60 sec)

Step 6c: Remove the gown

1. Untie the gown
2. Remove the gown from behind starting at the neck and shoulders
3. Pull gown away from you, turning it inside out, removing hands last

4. Fold or roll the gown into a ball
5. Put the gown in the infectious waste bag for destruction

Step 6d: Perform hand hygiene

- ✓ Alcohol-based handrub solution (20-30 sec) **OR**
- ✓ Soap and water (40-60 sec)

Step 6e: Remove face protection

When wearing a face shield

- ✓ Remove face shield from behind
- ✓ If face shield is reusable, place it in an infectious waste bag for disinfection
- ✓ If face shield is disposable, place it in an infectious waste bag for destruction

OR

When wearing goggles

- ✓ Remove goggles from behind
- ✓ If reusable goggles, place it in an infectious waste bag for disinfection
- ✓ If disposable goggles, place it in an infectious waste bag for destruction

Step 6f: Perform hand hygiene

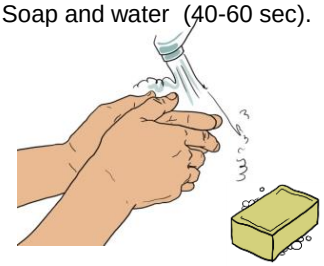
- ✓ Alcohol-based handrub solution (20-30 sec) **OR**
- ✓ Soap and water (40-60 sec)

Step 6g: Remove medical mask

- ✓ Remove the mask from behind, starting with the bottom strap
- ✓ Place it in an infectious waste bag for destruction

Step 6h: Perform hand hygiene

- ✓ Alcohol-based handrub solution (20-30 sec) **OR**
- ✓ Soap and water (40-60 sec).



Quick Tips

- Place all reusable equipment into a separate infectious waste bag for disinfection
- Dispose of hazardous waste according to facility protocols

When collecting sputum samples from multiple patients

- Change gloves between each patient
- Wash hands between each patient
- DO NOT WASH GLOVED HANDS
- DO NOT REUSE GLOVES

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