

## Service update: *Bordetella pertussis* diagnostic testing

Recommended tests for *B. pertussis* testing vary according to the length of time since cough onset, see table 1.

Time since onset of cough	Optimal test	Alternative tests	Comments
< 14 days	PCR	Culture	PCR = gold standard test Culture lacks sensitivity, particularly after first week of illness
14-21 days	PCR	Culture	PCR = gold standard test Culture lacks sensitivity, particularly after first week of illness
		Oral fluid for IgG detection (2-16yr olds)	Oral fluid kit must be ordered from the local Health Protection Team. It is only available for 2-16 yr olds.
> 21 days	Serum for Antibody titres (> 16yr old)	Oral fluid for IgG detection (2-16yr olds)	Antibody levels can be confounded by recent vaccination. Oral fluid kit must be ordered from the local Health Protection Team. It is only available for 2-16 yr olds.



### ***Bordetella pertussis* PCR**

Molecular testing (PCR) is much more sensitive than culture for the detection of acute *B. pertussis* infection and is the gold-standard test in early infection ( $\leq 3$  weeks duration).

#### **Specimen type and collection container for PCR testing:**

The optimal sample is a **dry swab**:

- Preferably a pernasal swab obtained using a thin-wire flexible dry swab.
- If pernasal is not possible, a thin rigid dry swab can be used to collect sample from throat and/or nose (like covid testing).
- Dry swabs are processed on site at HSL with time to result of 2-3 days.

Container type	Swab image (example)	Impact on testing
<b>Thin-wire flexible dry swab (orange lid dry 'ENT' swab) *</b>		<b>Preferred swab type:</b> Allows sampling of nasopharynx = best yield Time to result 2-3 days
<b>Thin rigid dry swab (eg. covid swab) *</b>		Time to result 2-3 days

## Alternative specimen type and collection containers for PCR

If dry swabs are not available, the following samples are acceptable:

- Swab taken from nose or throat, sent in Viral Transport Medium (VTM) or Universal Transport Medium (UTM)
- Naso-pharyngeal aspirate (NPA) in universal container
- These sample types cannot be tested on-site and, therefore, have a longer turnaround time.

\*Please note images are typical examples of swabs but may vary between manufacturers

## **Bordetella pertussis culture**

*Bordetella pertussis* dies very rapidly outside the body, leading to poor recovery on culture.

Culture is possible in the early catarrhal stage of the infection, but has poor sensitivity compared with PCR. Culture is not recommended in later stages of infection due to unacceptable false negativity.

Time to result is 8-10 days owing to the slow growth rate of *Bordetella* sp in culture.

## Specimen type and collection container for culture testing

The only acceptable sample type for culture is a Pernasal thin-wire flexible charcoal swab.

- The posterior nasopharynx must be sampled because this contains the highest concentration of the *B. pertussis* bacteria.
- Nose and/or throat swabs have unacceptably low sensitivity and should be avoided.
- The swab must be transported in charcoal media to support survival of the organism and sent to the laboratory without delay.
- Charcoal swabs are not suitable for PCR testing.

Swab type	Swab image (example)
Thin wire flexible charcoal swab (orange lid)	

## Collecting a Pernasal swab for *Bordetella pertussis* sampling

- Wear a mask and eye-protection because the patient is likely to cough.
- Gently push the flexible thin-wire swab along the floor of the nasal cavity until it reaches the nasopharynx.
- Hold the swab against the posterior wall of the nasopharynx for up to 30 seconds, or until the patient coughs.
- After removal, place the swab quickly into the swab container and send to the laboratory immediately.

