
Lab Dept: Microbiology/Virology

Test Name: BORDETELLA PERTUSSIS & PARAPERTUSSIS PCR

General Information

Lab Order Codes: BORDP

Synonyms: Bordetella pertussis and parapertussis PCR; Pertussis PCR; Whooping cough PCR

CPT Codes: 87798 x2 – Infectious agent detection by nucleic acid, not otherwise specified; amplified probe technique, each organism

Test Includes: Detection of *Bordetella pertussis* and/or *Bordetella parapertussis* DNA by PCR from symptomatic patients suspected of having pertussis (whooping cough). This assay is not meant to be used for testing asymptomatic patients. This assay targets the *Bordetella pertussis* insertion sequence IS481 and *Bordetella parapertussis* insertion sequence IS1001.

Logistics

Test Indications: Diagnosis of *Bordetella pertussis/parapertussis* infection.

Lab Testing Sections: Molecular Diagnostics, Mpls campus only

Phone Numbers: 612-813-7103

Test Availability: Daily, 24 hours

Turnaround Time: 8 - 24 hours

Special Instructions: Requisition must state specific type of specimen and date/time of collection.

Specimen

Specimen Type: Nasopharyngeal swab, bronchoalveolar lavage (BAL), bronchial wash, nasal wash/aspirate

Container: **Flexible shaft swab:** BBL mini-tip CultureSwab® Liquid Stuart's Transport System (green top) or Mini-tip CultureSwab® Amies Charcoal Transport System (green top)

Sterile Container: for nasopharyngeal wash/aspirate/lavage, bronchoscopy

Draw Volume: 1 NP swab or 1-2 mL (0.5 mL minimum) Nasal wash/aspirate, bronchoalveolar lavage (BAL), bronchoscopy samples

Collection: **Nasopharyngeal Washings:**

1. Tilt patient's head back at a 70° angle.
2. Insert rubber bulb syringe containing 1 – 2 mL of sterile saline until it occludes the nostril.
3. Collect specimen with one complete squeeze and release bulb.
4. Repeat in other nostril.
5. Dispense the specimen into a sterile screw cap container and transport to the lab immediately.

Nasal Aspiration:

1. Prepare suction set up on low to medium suction.
2. Wash hands.
3. Put on protective barriers (e.g., gloves, gown, mask).
4. Place child supine and obtain assistant to hold child during procedure.
5. Attach luki tube to suction tubing and #6 French suction catheter.
6. Insert catheter into nostril and pharynx without applying suction.
7. Apply suction as catheter is withdrawn.

NP Swabs (1):

1. Carefully insert a flexible-shaft mini-tip swab containing a dry tip into the nasopharyngeal cavity until resistance is encountered.
2. Rotate the swab slowly on the nasopharyngeal membrane for 5-10 seconds to absorb secretions.
3. Remove the swab, place in swab transport medium and send to the lab immediately.

Bronchoscopy:

1. Specimen obtained by physician through biopsy channel of the bronchoscope.
2. Transfer 1-2 mL of sample into a sterile container.

Transport/Storage: Transport to the Laboratory at room temperature. If a delay is anticipated, refrigerate specimen at 4°C.

- NP swabs and nasal specimens are stable at room and refrigerated temperatures for 5 days.
- Bronchoscopy specimens are stable at room temperature for 4 h and refrigerated temperatures for 5 days.

Patient Preparation: None

Sample Rejection: Calcium alginate swabs (inhibitory to PCR), sputum, specimen not submitted in appropriate transport container; improperly labeled specimen. If an unacceptable specimen is received, the patient's care giver will be notified and another specimen will be requested before the specimen is discarded.

Interpretive

Reference Range: Negative for *Bordetella pertussis* and *Bordetella parapertussis*

Alert Values: Positive results will be phoned to the patient's caregiver.

Limitations:

1. Negative results do not rule out *B. pertussis* and *B. parapertussis*
2. PCR detection of *B. pertussis* and *B. parapertussis* does not distinguish between viable and non-viable organism. Results should be used in conjunction with an evaluation of signs and symptoms of pertussis and available exposure information.
3. This assay should not be used for asymptomatic individuals.
4. This test should not be used as a test for cure for *B. pertussis* and *B. parapertussis*.
5. This test does not distinguish between *B. pertussis* and *B. holmseii*. Some strains of *B. bronchiseptica* also contain the IS481 gene and will cross-react at a lower level.
6. The IS1001 target sequence can occasionally be found in *B. bronchiseptica*.
7. False-positive PCR results and pseudo-outbreaks have been associated with specimen contamination at the point of collection from some vaccines containing *B. pertussis* DNA.
8. False-negative results can occur when low numbers of organism are present. PCR has optimal sensitivity during the first 3 weeks of cough.
9. False-negative results may occur if *B. pertussis* and *B. parapertussis* has genomic mutations, insertions, deletions or rearrangements.
10. Consider culture back-up during outbreak situations to rule out possible contamination.

Methodology: Real-Time Polymerase Chain Reaction

References: Miller, J Michael (1999) A Guide to Specimen Management in Clinical Microbiology, American Society for Microbiology, Washington DC, p100

Baron, EJ and RB Thompson Jr (2011) Specimen Collection, Transport, and Processing: Bacteriology In J. Versalovic, et al, (ed), Manual of Clinical Microbiology, 11th edition, American Society for Microbiology, Washington DC, p 237

Bordetella PCR Clinical Verification and Validation Study performed at Children's Hospitals and Clinics of MN (2015)

Updates 5/6/2016: Updated Test Includes and Limitations.

