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Bordetella pertussis

Bordetella pertussis is a Gram-negative, encapsulated coccobacillus and the causative agent of Whooping cough, a respiratory infection so called due to its characteristic sound when inhaling after coughing. *B. pertussis* is highly contagious and is transmitted via airborne respiratory droplets from the nose and throat of infected individuals. Symptoms typically appear 7 to 10 days after infection, but may also appear up to 21 days later. People of all ages are affected and around 16 million people are infected worldwide, annually. Whooping cough can be fatal for young babies as they are most at risk of developing severe complications. In adults, the disease is milder, and is less likely to result in severe complications or death. Complications in babies include: pneumonia, dehydration, difficulty breathing, kidney failure, and brain damage.

In the UK, cases of whooping cough have decreased each year, although there are seasonal outbreaks. This is likely due to the introduction of the vaccination programme where young children are given a 5 in 1 vaccine at ages 8, 12 and 16 weeks, and an additional booster before starting school. Pregnant women are also offered vaccination after the foetal anomaly 20-week scan to provide immunity to the baby in the first few weeks after birth prior to vaccination. Most cases occur in babies younger than 6 months who are too young to be fully vaccinated, children aged 11 to 18, and in adults who's immunity has waned over time or as a result of incomplete immunisation.

Diagnosis:

B. pertussis is predominantly identified using laboratory methods including culture, often using selective media incubated for up to 7 days. Despite this, molecular methods such as PCR can be particularly useful, offering a rapid detection method with increased sensitivity when compared with typical culture methods. Hence, PCR can be an important tool in the detection of *B. pertussis,* particularly in patients with signs symptoms consistent with *B. pertussis* infection. The Centers of Disease Control and Prevention states that nasopharyngeal aspirates (NPAs) and nasopharyngeal swabs are the most suitable specimens for *Bordetella pertussis* DNA detection. Specimen collection during the initial 3 weeks of cough onset is also recommended for optimal PCR sensitivity.

Our assay:

At Micropathology Ltd we use a qualitative, semi-nested PCR assay which targets the *B. pertussis* toxin gene for the detection of *B. pertussis* DNA. Additionally, the IS*481* assay is run in parallel, to increase the sensitivity of detection. UKAS accredited specimen types for this assay include nasopharyngeal aspirates (NPAs) and upper respiratory swabs. Other sample types may be tested and are reported alongside an appropriate caveat stating that the sample provided is not accredited or validated for this assay. Turnaround times are stated in the user manual (http://www.micropathology.com/customer-downloads-handbooks.php) with results usually available in practice much sooner than the given time frame. Where there is a delay, we are usually confirming a result and addressing clinical data given with the specimen.