Respiratory Panel Qualitative Real-time PCR

Influenza A and B (Flu A & B) are RNA viruses responsible for a range of symptoms, including croup and pharyngitis in uncomplicated infections. In infants, vomiting and convulsions can also be seen. Complications can arise in a small proportion of cases and usually consist of respiratory difficulties, such as rales, rhonchi, productive cough, chest tightness, substernal soreness, and pneumonia (usually due to secondary bacterial infection). In chronic pulmonary disease, fatal bronchitis can result from Influenza A or B infection. Reye's syndrome is another rare complication that can follow influenza infection.

Parainfluenza 1, 2, 3 and 4 (Paraflu 1, 2, 3, 4) are four serotypes in the paramyxoviruses. In children, the parainfluenza viruses are most commonly characterized clinically by the onset of croup. Typical symptoms include cough, inspiratory stridor, hoarse voice, and difficulty inhaling, with about 80% of patients developing a cough and runny nose 1-3 days prior to the onset of croup. Usually respiratory symptoms will subside within 1-2 days; however, children less than three years of age may experience recurrent attacks by the same virus serotype due to both ineffective antibody response and narrower diameters of various areas of the respiratory tract.

Respiratory Syncytial Virus (RSV) is an RNA virus classified into two major subgroups, A and B. Highly contagious, it is estimated that nearly half of all infants will acquire an RSV infection during their first year of life. Of those, approximately one third will develop lower respiratory tract disease. Initial symptoms include fever and upper respiratory tract infection. As the infection progresses, it may involve the lower respiratory tract to cause cough, tachypnoea, dyspnoea, wheezing, crackles, hypoxemia, and cyanosis. The most frequent complication that arises from RSV infection is chronic lung disease due to prolonged alterations in pulmonary function during infection.

Human Metapneumovirus (hMPV) is an RNA virus from the family Paramyxoviridae and related to respiratory syncytial virus (RSV). HMPV causes clinical syndromes indistinguishable from RSV, including bronchiolitis, croup, asthma exacerbation, and pneumonia. Epidemiological data indicate prevalence of 4-12% for hMPV infection in children with lower respiratory tract illnesses.

Human Rhinoviruses (hRV) are classified into three species within the genus Enterovirus. Rhinovirus infections are among the most frequent causes of the common cold and recently have been linked to more severe lower respiratory disease in otherwise healthy children, the elderly, and the immunocompromised. For these patients, the ability to determine the cause of severe respiratory disease is very useful.

Human Coronaviruses (hCoV) are large, enveloped RNA viruses that infect both humans and animals. Seven strains that commonly infect humans include two alpha and beta coronaviruses, SARS-CoV-1 and -2 (which causes Severe Acute Respiratory Syndrome), and MERS-CoV (which causes Middle East Respiratory Syndrome). They typically cause upper respiratory infections in humans. Symptoms may include runny nose, cough, sore throat, and fever. They can cause lower respiratory tract illness such as pneumonia, but this is more common in patients with immunocompromising illnesses or cardiopulmonary disease. Real-time RT-PCR provides a rapid and sensitive method to determine the presence of target-specific amplifiable nucleic acids in all samples intended for PCR[1-10]. This assay does not detect SARS or MERS. For more information, call the lab at 513-636-9820.

Reporting Units:

Positive/Negative

Unacceptable Specimens:

- Frozen whole blood
- Swabs in gel or charcoal media

Shipping Conditions:

- Ambient if sent within 24 hours
- On wet ice if sent >24 hours after collection

Testing Schedule:

Respiratory panel and individual analyte(s) testing is performed Mon-Sat on first shift. Seasonally, it is also performed on second shift Mon-Fri and first shift on Sun. For testing outside of this schedule, call the lab at 513-636-9820. **TAT:** 1-3 days

CPT Codes:

Respiratory Panel: 87798 x9
Influenza viruses A & B: 87798 x2
Parainfluenza viruses 1, 2, 3, 4: 87798 x4
RSV: 87798
Human Metapneumovirus: 87798
Rhinovirus: 87798
Coronavirus: 87798

Contact Information:

Cincinnati Children's Division of Pathology
Molecular and Genomic Pathology Services
Phone: 513-636-9820
Fax: 513-803-2941
Email: pathology@cchmc.org
Website: cincinnatichildrens.org/pathology

For pricing or billing questions, call 513-636-9264.

Shipping Address:

Cincinnati Children's Hospital Medical Center
Lab Processing, B4.127
Attn: Molecular and Genomic Pathology Services (MGPS)
3333 Burnet Ave.
Cincinnati, OH 45229

References:

1. van den Hoogen B, Osterhaus A, Fouchier R. Clinical impact and diagnosis of human metapneumovirus infection. *Pediatr Infect Dis J.* 23:S25-32. 2004.
2. Williams J, Harris P, Tollefson S, et al. Human metapneumovirus and lower respiratory tract disease in otherwise healthy infants and children. *N Engl J Med.* 350:443. 2004.
3. Mullins J, Erdman D, Weinberg G, et al. Human metapneumovirus infection among children hospitalized with acute respiratory illness. *Emerg Infect Dis.* 10:700-705. 2004.
4. Watzinger F, Suda M, Preuner S, et al. Real-time quantitative PCR assays for detection and monitoring of pathogenic human viruses in immunocompromised pediatric patients. *J Clin Microbiol.* 42:5189-5198. 2004.
5. Kuypers J, Wright N, Morrow R. Evaluation of quantitative and type-specific real-time RT-PCR assays for detection of respiratory syncytial virus in respiratory specimens from children. *J Clin Virol.* 31:123-129. 2004.
6. Zuckerman A, Banatvala J, Griffiths P, et al, eds. Principles and Practice of Clinical Virology. 2nd ed. John Wiley and Sons, New York, 1990.
7. Lu X, Holloway B, Dare R, et al. Real-time reverse transcription PCR assay for comprehensive detection of human rhinoviruses. *J Clin Microbiol.* 46:533-539. 2008.
8. Crooks B, Taylor C, Turner A, et al. Respiratory viral infections in primary immune deficiencies: significance and relevance to clinical outcome in a single BMT unit. *Bone Marrow Transplantation* 26:1097-1102. 2000.
9. Kleber de Souza Luna L, Heiser V, Regamey N, et al. Generic detection of coronaviruses and differentiation at the prototype strain level by reverse transcription-PCR and nonfluorescent low-density microarray. *J Clin Microbiol.* 45:1049-1052. 2007.
10. About Coronavirus, http://www.cdc.gov/coronavirus/about index.html. Last Reviewed: June 5, 2014.

Sample Type	Volume Needed	Collection Container
Aspirate: endotracheal tube, tracheal	1mL	Sterile Container
Bronchoalveolar Lavage (BAL) fluid	1mL	Sterile Container
Body Fluids (i.e. pericardial, pleural)*	1mL	Sterile Container
Swab**: nasal, nasopharyngeal, throat	n/a	Red or Green Culturette Swab
Tissue (lung) ***	0.3 g	Sterile Container

* Not preferred specimen types for analyzing respiratory viral agents.
** Red or green top culturette swabs preferred; viral transport media acceptable.
*** Wrap tissue in gauze wetted slightly with sterile saline to keep moist during transport.

Clinical Lab Index:
Resp Panel: https://www.testmenu.com/cincinnatichildrens/Tests/662819
Influ A/B: https://www.testmenu.com/cincinnatichildrens/Tests/662814
Para 1/2/3/4: https://www.testmenu.com/cincinnatichildrens/Tests/662816
RSV: https://www.testmenu.com/cincinnatichildrens/Tests/662818
MPV: https://www.testmenu.com/cincinnatichildrens/Tests/662813
Rhino: https://www.testmenu.com/cincinnatichildrens/Tests/662835
Corona: https://www.testmenu.com/cincinnatichildrens/Tests/662830