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**Review Paper**

# Human Metapneumovirus: An Overview of Its Impact on Human Health

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## ABSTRACT

Human metapneumovirus (HMPV), discovered in 2001, most commonly causes upper and lower respiratory tract infections in young children, but is also a concern for elderly subjects and immune-compromised patients. HMPV is the major etiological agent responsible for about 5% to 10% of hospitalizations of children suffering from acute respiratory tract infections. HMPV infection can cause severe bronchiolitis and pneumonia in children, and its symptoms are indistinguishable from those caused by human respiratory syncytial virus.

## INTRODUCTION

HMPV is the major ethilogical agent responsible for about 5% to 10% of hospitalization of children suffering from acute respiratory tract infection. HMPV infection can cause severe bronchiolitis & pneumonia in children & its symptom are indistinguishable from those caused by human respiratory syncylial virus. Infection with HMPV usually occur by the age of 5 year with reinfection that can occur throughout life. The most predominant clinical scenario caused by HMPV infection is upper & lower respiratory tract infection. [1,5] With lower respiratory tract infection being among the most common. Lower respiratory tract infection due to HMPV can lead to pneumonia, bronchiolitis as well as acute asthama exacerbation. The mainstay of treatment is supportive care measure with supplement oxygen, antipyretic agent& hydration with intravenous fluid if needed.[2,4]

**Etiology:**

HMPV is a lipid-enveloped single-standed, negative sense, non- segmented RNA virus that was reclassified in 2016 from the Paramyxovirdac family to the Pneumoviridac family & the Metapnemovirus genus. It spread by infection respiratory droplet.[11,18]

**Pathophysiology:**[13,15]

HMPV is spread from person to person via respiratory droplet. The incubation period of

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HMPV ranges between 3 to 5 days & varies between individuals. After inoculation with the nasopharyngeal mucosa the virus can rapidly spread into respiratory tract. The inflammatory process also result in monocyte & lymphocyte influx within the airway endothelium. These responses combined lead to pulmonary inflammation causing the respiratory manifestation of cough, mucous production, fever, dyspnea.

**History & Physical:**

HMPV can present as either upper respiratory tract infection & lower respiratory tract infection. Common symptom of upper respiratory tract infection include cough, congestion & sore throat. Lower respiratory tract infection symptom include wheezing fever, cough, dyspnea, hypoxia. Lower respiratory tract infection in children cause bronchiolitis, acute asthama, exacerbation & pneumonia. Necessitate hospital admission depending severity of symptom.[1,5,9]

**Evaluation:**

Most commonly confirmation of infection by HMPV is done by reverse transcriptase polymerase chain reaction (RT-PCR) from nasopharyngeal swabs. Radiographic finding on a chest X- ray[20].

**Treatment:**

The primary mainstay of treatment are supportive measures. Anti-pyretic medication such as Acetaminophen (paracetamol) & Ibuprofen are given to those patient with fever.

If the patient appears dehydrated & cannot tolerate oral hydration, intravenous fluid hydration is indicated. Additionaly patients with HMPV may require supplemental oxygen support in severe causing acute respiratory failure.[22,15]

**Complication:**

Within certain patrient population HMPV can cause severe illness requiring hospitalization. Among those are patient who are immunocompromised or have a pre existing cardiac or respiratory condition. These patient are more susceptible to developing acute respiratory failure requiring high flow oxygen support with some patient even deteriorating enough to require mechanical ventilation. In these cases patient need to be admitted to the intensive care unit for close monitoring.[6,7,8]

**Detterence & Patient Education:**

Instruction for wiping down surface at home are essential to disclose to patient & patients family.

Appropriate hand washing is paramount as well as droplet precaution.

**Enhancing Healthcare Team Outcome**[10,13]

HMPV infection can lead to visit the emergency department or a primary care physician office. An interprofessional team approach is an important component of desease prevention, recognition & treatment. If the patient is stable for treatment as an outpatient, the doctor & nurses need to educate parent & patient on proper handwashing & the importance of wiping down surface with disinfectant at home. This is crucial when there are other member of the family at home especially those who are susceptible to infection. The doctor, nurses, patient, there parents of the patient or

anyone involved in direct care of the patient should wear a mask to cover there nose & mouth. They should also wash & sanitize there hand before entering & exiting the room. The doctor should also verify the patient medical history in order to determine illness, severity, progression & those who are at high risk. While the workup of the patient is in progress, the nurses should alert the doctor regarding changes in vital sign & respiratory status. This help identify the need for acute management for the patient, such as supplemental oxygen or mechanical ventilation.

If needed the pharmacist can also help to educate the patient & parents that treatment is mainly supportive. The measure enhance patient centered care to improve outcome & provide safely for the patient with HMPV as well as others.

## CONCLUSION:

Human metapneumovirus (HMPV) is a significant respiratory pathogen, causing substantial morbidity and mortality. Understanding its pathogenesis and molecular constraints is crucial for developing effective treatments and vaccines. Recent animal model studies and reverse genetics platforms have advanced our knowledge of HMPV pathogenesis. The next step involves initiating clinical trials to evaluate various treatment modalities and vaccine candidates.

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