

CIRCULATING TREND of HUMAN RHINOVIRUS (hRV) among PATIENTS with RESPIRATORY INFECTION SYMPTOMS: DATA ANALYSIS from 2019 to 2022.

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INTRODUCTION

Human Rhinovirus (hRV) is a small non-enveloped single-stranded RNA virus (1). It is one of the most common respiratory viruses causing both upper and lower respiratory tract infections in humans worldwide. Aim of study is to analyze circulating trend of hRV among patients presenting respiratory infection symptoms.

METHODS

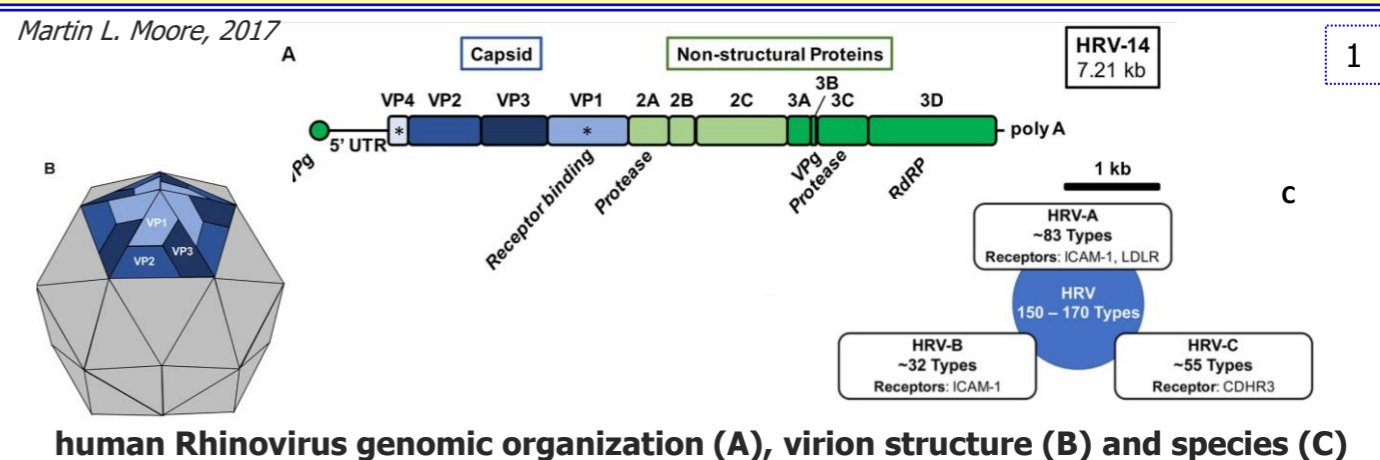
From January 2019 to December 2022, respiratory samples were collected and tested for the detection of respiratory viruses. Samples included nasopharyngeal swabs, tracheal aspirates and bronchoalveolar lavage specimens. hRV detection was performed using a multiplex real-time PCR assay according to the manufacturer's instructions (*Anyplex™ II RV 16 Detection Kit v1.1, Seegene*) (2).

RESULTS

1229 respiratory samples were collected (56% M – 44% F). 129 samples (10%) were positive for hRV (10% M – 9% F). Positivity rates were 22% (28/127) in the 2019, 8% (24/296) in the 2020, 13% (34/264) in the 2021 and 11% (43/542) in the 2022. hRV mostly affected pediatric populations (54% patients were younger than 2 years), older people (24%) and immunocompromised patients (8%). hRV infections were significantly higher in the winter period than in summer: during the study period three infection peaks were observed (February 2019, n=12; November 2021, n=17, November 2022, n=22). No infection peak was observed in 2020: hRV detections decreased during COVID-19 pandemic period but hRV continued to circulate and remained the main respiratory pathogen co-circulating with SARS-CoV2. In total, 26% (34/129) cases with co-infections were identified: regarding viral co-pathogens, respiratory syncytial virus and parainfluenza virus were found most frequently (3,4,5).

CONCLUSIONS and DISCUSSION

During the last four years we have noted a strong increase in the respiratory virus PCR panel analysis demand; our data show that hRV is the main detected virus in paediatric patients. It is present in the majority of viral co-detections. Generally RV circulates throughout the whole year with a peak of infections during the winter. We find that RV persists throughout the COVID-19 pandemic and remain the main virus co-circulating with SARS-CoV2: our data support that RV is unaffected by the presence of SARS-CoV-2 and raise the hypothesis that non-enveloped viruses are more stable and have high resistance to the conventional implemented COVID-19 control measures. We observe that RV cause prolonged infections in high-risk patients such as the older and immunocompromised populations. For this reason, RV infections should be systematically monitored and co-infections with other pathogens have to be considered when evaluating the illness severity of hRV infections. Finally it would also be of particular interest hRV molecular subtype and study the role of different rhinovirus species in predisposing patients to severe hRV infections: continued surveillance of respiratory viruses trend contributes to effective diagnostic, prevention and treatment strategies.



human Rhinovirus genomic organization (A), virion structure (B) and species (C)

Respiratory Panel 1

- Influenza A virus
- Influenza A-H1
- Influenza A-H1pdm09
- Influenza A-H3
- Influenza B virus
- Respiratory syncytial virus A
- Respiratory syncytial virus B

Respiratory Panel Assay

ANALYTES

Respiratory Panel 2

- Bocavirus 1/2/3/4
- Coronavirus 229E
- Coronavirus NL63
- Coronavirus OC43
- Human rhinovirus

Respiratory Panel 3

- Adenovirus
- Enterovirus
- Metapneumovirus
- Parainfluenza virus 1
- Parainfluenza virus 2
- Parainfluenza virus 3
- Parainfluenza virus 4

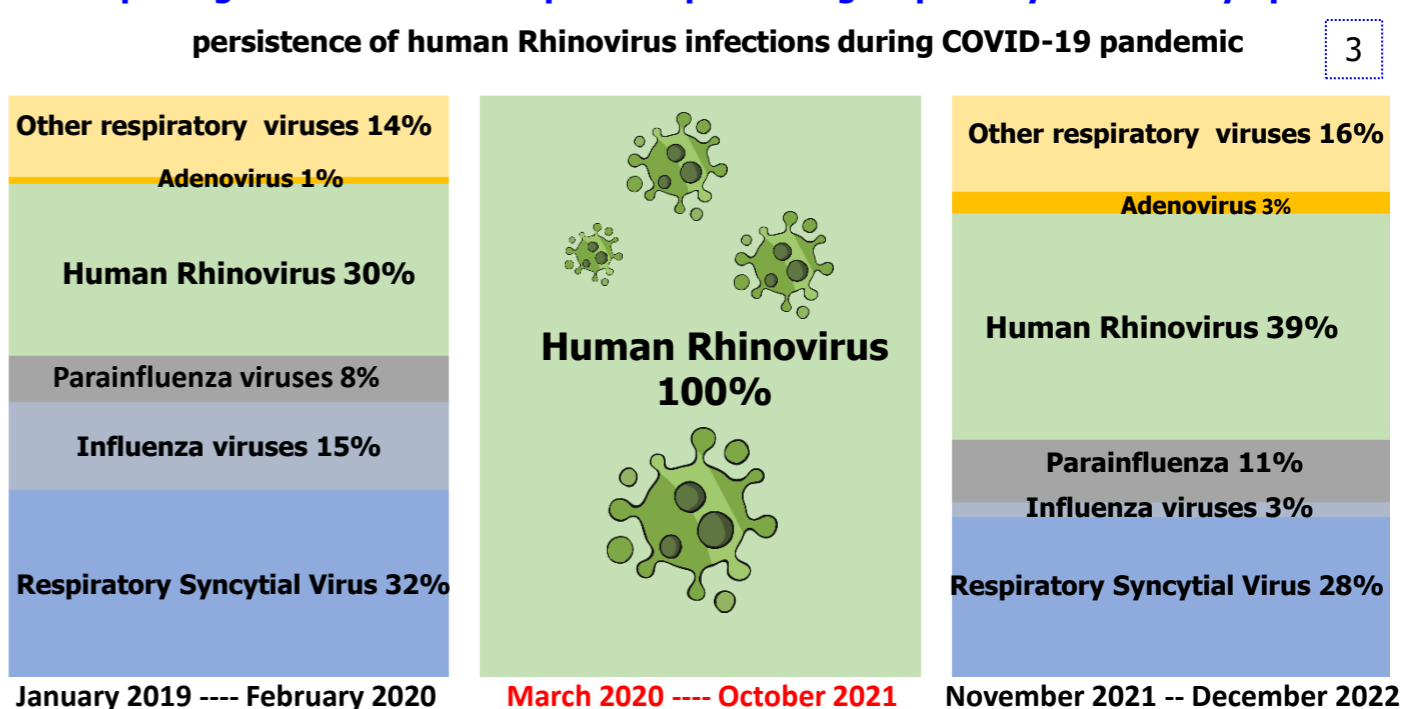
Respiratory Panel 4

- Bordetella parapertussis*
- Bordetella pertussis*
- Chlamydomphila pneumoniae*
- Haemophilus influenzae*
- Legionella pneumophila*
- Mycoplasma pneumoniae*
- Streptococcus pneumoniae*

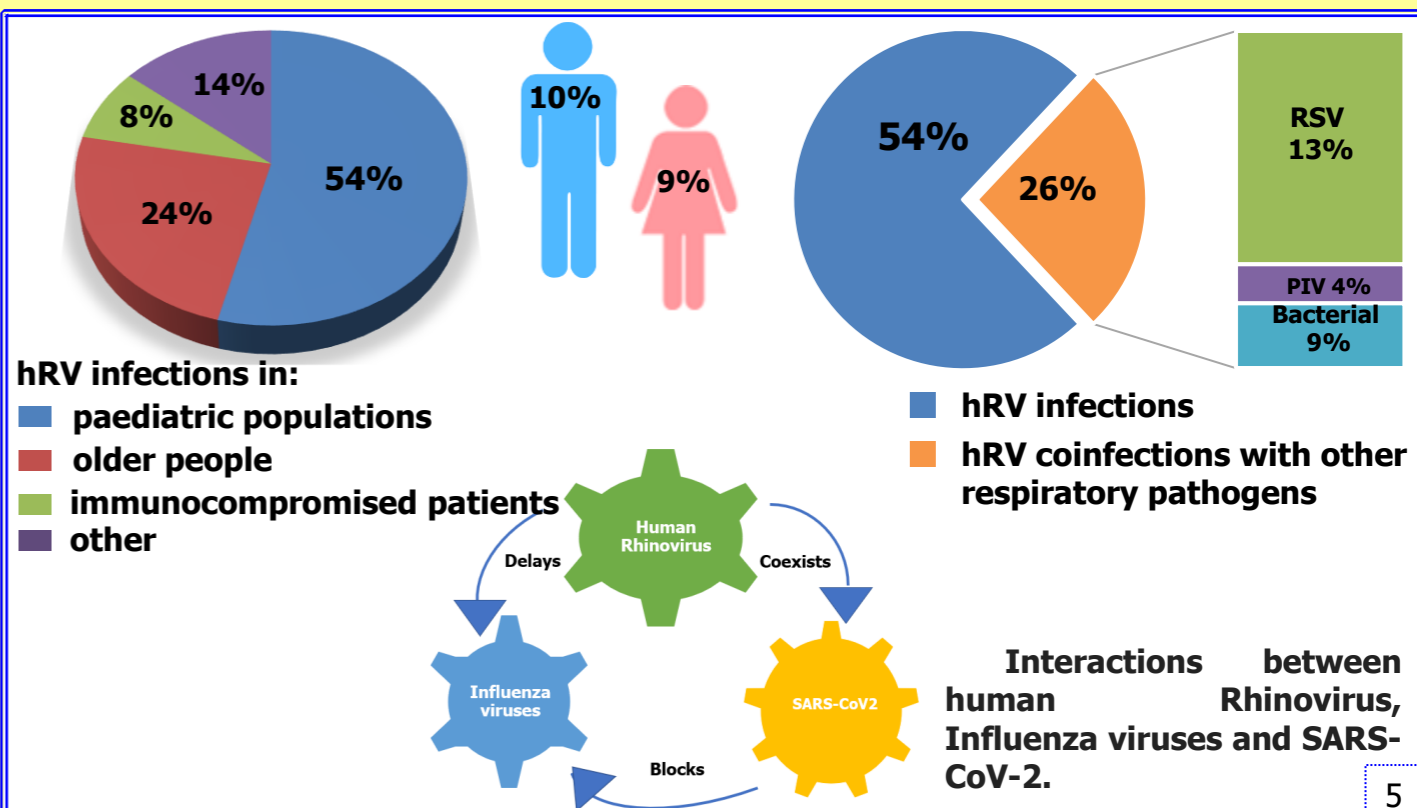
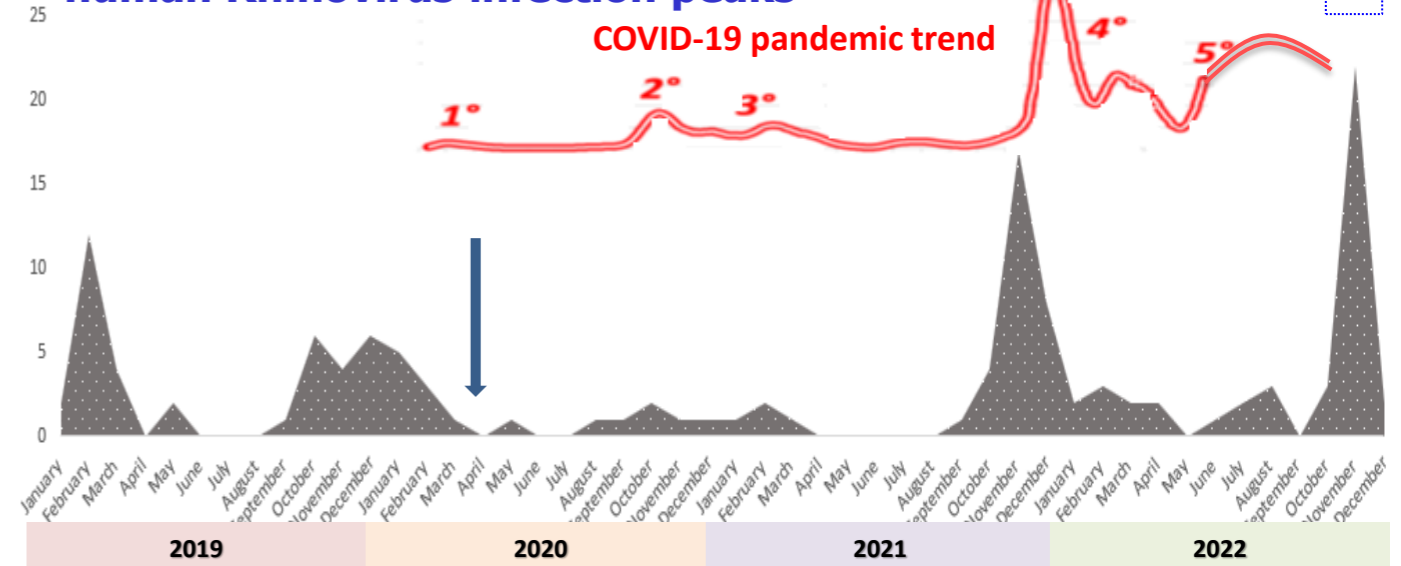


Anyplex™ II RV 16 Detection Kit v1.1, Seegene

Viral pathogen contributions in patients presenting respiratory infection symptoms: persistence of human Rhinovirus infections during COVID-19 pandemic



human Rhinovirus infection peaks



50° CONGRESSO NAZIONALE AMCLI

24 - 27 Marzo 2023, Palacongressi Rimini



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