IVD_17 - Evaluation of respiratory viruses multiplex assay using RT-PCR

Mônica Barcellos Arruda[1]; Pedro Henrique Cardoso[1]; Marisa de Oliveira Ribeiro[1]; Alexandre Rodrigues Calazans[1]; Alexandre Vicente Frederico[1]; Beatriz Vasconcello de Souza Barreto[1]; Fernando do Couto Motta[2]; Marilda Agudo Mendonça Teixeira de Siqueira[2]; Patrícia Alvarez Baptista[1].
[1]Fiocruz/Bio-Manguinhos
[2]IOC/Fiocruz

Introduction: Viruses like Influenza A(INFA), Influenza B(INFB), SARSCoV-2(SC2), Respiratory Syncytial Virus (RSV), Human Metapneumovirus (HMPV), Adenovirus (ADV) and Rhinovirus (HRV) are etiological agents of acute upper respiratory diseases that can affect the bronchi and lungs and represent an important cause of pneumonia in children and adults. Some of these viruses can evolve and spread quickly as in the H1N1 2009 and COVID-19 global pandemics. With the development of new diagnostic tests, the wieldy of more accurately differentiating these viruses is fundamental for clinical management with more efficient treatments to control the impact of respiratory tract infections.

Objectives: The aim of this study was to evaluate the prevalence of respiratory viruses (RV) in Brazil, using multiplex real-time PCR methodology to identify INFA, INFB, SC2, HMPV, RSV, ADV, HRV through the assay VR1/VR2, developed at Bio-Manguinhos/Fiocruz as an epidemiological surveillance study of the main and most prevalent circulating respiratory viruses.

Methodology: Multiplex real-time PCR methodology to identify INFA, INFB, SC2, HMPV, RSV, ADV, HRV.

Results: The VR1/VR2 Bio-Manguhinhos multiplex molecular assay is composed of 2 modules, able to discriminate VR and the human constitutive gene RNAse P (RP) as an internal reaction control, with VR1 identifying INFA, INFB, SC2, HMPV and VR2 identifies RSV, ADV, HRV. This trial was distributed in the multicenter study with the LACENs: TO, SE, BA, MG, RN, GO, SC and RS, in June 2023. The study received 2667 results. Of these samples we identified 1034 (38.77%) positive samples for VR, with 33 (1.24%) positive results in samples from INFA, INFB 22 (0.82%), SC2 154 (5.77%), HMPV 98(3.67%) and ADV 45(1.69%), RSV 180(6.75%) and HRV 502(18.82%). In LACEN distribution, we identified a frequency of positive samples among all viruses of 27.03% in TO, 24.51% in SE, 58.32% in BA, 29.44% in MG, 29.03% in RN, 43.01% in GO, 54.65% in SC and 43.48% in RS. The highest prevalence among the viruses was HRS in all states.

Conclusion: These results demonstrate the efficiency in identifying the main VR and the importance of identifying and monitoring these viruses in Brazil, mainly using a multiplex product that can identify the 7 viruses in just 2 reactions. Furthermore, this molecular strategy can work as an epidemiological surveillance.

Keywords: VR1/VR2; Multiplex real-time PCR