Mini Review

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Comparative analysis of molecular techniques for the diagnosis of respiratory viruses: real time RT-PCR vs POCT system of the hospital Teodoro Maldonado carbo of Guayaquil

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Review

The scientific paper examines the comparative efficacy of two molecular diagnostic methods, RT-qPCR and the POCT System, in the detection of respiratory viruses in patient samples.[1] RTqPCR, known for its high specificity, is compared with the POCT System, which offers fast and close-to-patient results, albeit with slightly lower specificity. The study highlights the importance of these methods in the early detection of pathogens, especially in critical situations where time is of the essence. It was found that both methods showed high reliability in virus detection, with specificity values between 80% and 100%. RT-qPCR exhibited an outstanding specificity of 100%, while the POCT system reached a value of 85.7%.[2,3]

Furthermore, the usefulness of the POCT System in resource-limited settings or in remote areas, where it can facilitate rapid detection of infectious diseases and longitudinal monitoring, is highlighted. This aspect is crucial in population and epidemiological studies, where agility in obtaining results can lead to a faster and more effective medical response.[4] The article also discusses the incidence of positivity in different age groups, highlighting a high positivity in pediatric patients, especially in children under 5 years of age. However, a discrepancy is noted in comparison with other studies, particularly in relation to the severity of COVID-19 and its association with advanced age. This discrepancy is attributed to the specific characteristics of the population studied and the period of data collection. In summary, the article underscores the importance of RT-qPCR and the POCT System in the diagnosis of infectious diseases, highlighting their respective strengths and areas of application. Furthermore, it highlights the need for further research to validate and compare these methods in different clinical and population settings (Table 1). Research conducted in Ecuador has yielded significant results regarding the specificity of two important molecular diagnostic methods for respiratory viruses.[8] With a focus on the POCT System and RT-qPCR, it has been confirmed with certainty that both tests are highly specific, with RT-qPCR being especially outstanding with a specificity of 100%, attributed to the precision of its specific primers for each virus detected.

Table 1 Specificity, variables and formula

Description	Fórmula	Reference
Specificity: where "d" is the patient does not have the disease and the test is negative and "b" says the patient does not have the disease, but the test result is positive.	$Specificity = \dfrac{D}{B + D}$ $Specificity = \dfrac{D}{sanos}$	Pértegas & Pita[6] Bravo & Cruz[7]

Source: Bio-Rad Laboratories,[5]

Bravo and Cruz[7] describe parameters to measure specificity.

True negative: patient without disease and negative test.

False positive: individual without disease with positive test.

Healthy: sum of true negatives and false positives.

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None.

Conflicts of interest

The authors declare that there are no conflicts of interest.

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References

1. Ballmann E. Genotyping of respiratory syncytial virus type in nasopharyngeal specimens in pediatric patients. 2021.

2. Álvarez H, Pérez E. Clinical utility of the 2x2 table. *Journal of Evidence and Clinical Research.* 2009;2(1):22–27.

3. Arandia Guzmán J, Antezana Llaveta G. SARS-CoV-2: structure, replication and pathophysiological mechanisms related to COVID-19. *Gaceta Médica Boliviana*. 2020;43(2):170–178.

4. BioFire® Respiratory Panel 2.1 (RP2.1). *BioFire®*. 2020.

5. Bio-Rad. Bio-Rad Laboratories. Inc. 2023.

6. Busquets M, Morales C, Norte C, et al. Utility of Ct value in acute respiratory infections caused by respiratory syncytial virus A and B and influenza viruses A (H1N1)pdm09, A (H3N2) and B. *Enferm Infecc Microbiol Clin (Engl Ed).* 2018;36(6):332–335.

7. Bravo S, Cruz J. Diagnostic accuracy studies: tools for their interpretation. *Revista Chilena de Radiología*. 2015;21(4):158–164.

8. Carballal G, Marcone D, Ricarte C. et al. Respiratory viral diagnosis by using an automated system of multiplex PCR (FilmArray) compared to conventional methods. *Rev Argent Microbiol*. 2015;47(1):29–35.