Comparison of Singleplex qPCR and the Luminex MAGPIX Platform for the Detection of Viral Pathogens

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1. Abstract

Introduction

Various respiratory molecular assays are available, each with different characteristics and advantages that make them uniquely valuable. The objective of this study was to compare rates of viral detection using singleplex and multiplex platforms in a research setting.

Summary

This prospective viral surveillance was conducted at Vanderbilt Children's Hospital in the inpatient, outpatient and emergency department settings. Nasal swabs were collected and tested using singleplex qPCR and the Luminex MAGPIX platform. The assays produced similar results but singleplex qPCR had a higher viral detection rate than the Luminex MAGPIX platform.

2. Methods

- Prospective viral surveillance study was conducted in Davidson County, TN. Infants under one year who presented with fever and/or respiratory symptoms were enrolled from the outpatient, emergency department and inpatient settings.
- Nasal swabs were collected and tested for influenza A (FluA), influenza B (FluB), human metapneumovirus (MPV), respiratory syncytial virus A and B (RSVA and RSVB), human adenovirus (AdV), parainfluenza 1, 2, 3, and 4 (PIV1-4) and SARS-CoV-2 by both singleplex qPCR and the Luminex NxTAG Respiratory Pathogen and NxTAG CoV Extended panels.
- Rhinovirus/enterovirus, human bocavirus, *Chlamydophila pneumoniae*, *Mycoplasma pneumoniae* and coronavirus HKU1, NL63, 229E and OC43 results from the Luminex panel were excluded.
- Cycle threshold (Ct) values from the singleplex qPCR results were used as a surrogate for viral load, with a higher Ct value indicating a lower viral load.

3. Results

Figure 1. Total viruses detected by detection platform

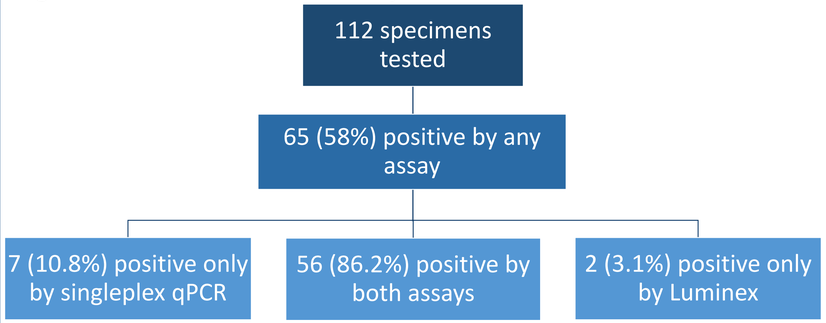


Figure 2. Number of different viruses detected by testing platform

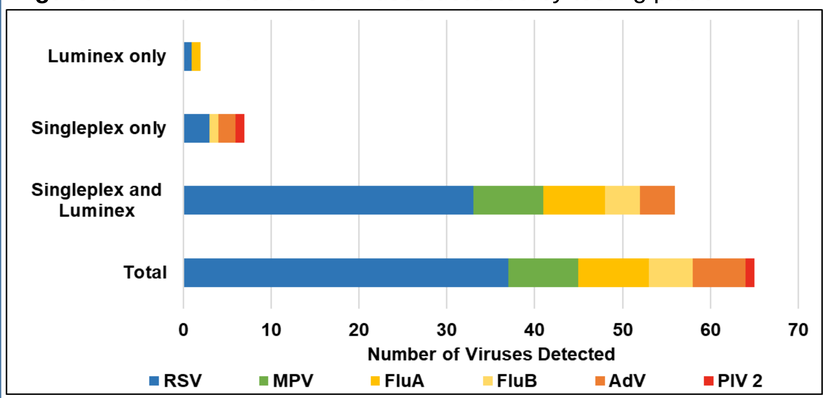
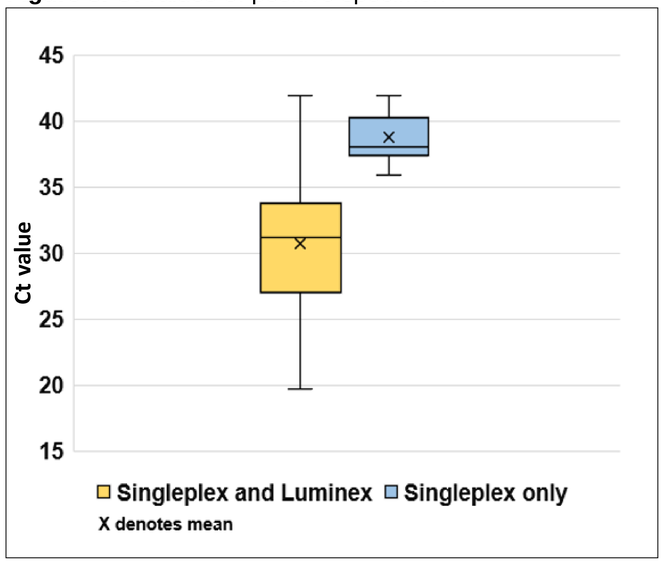


Figure 3. Ct values of positive specimen



4. Conclusion

- The multiplex assay identified 89% of the total viruses detected while singleplex qPCR identified 97% of the total viruses detected.
- Lower viral loads may contribute to false negative results on the multiplex platforms. Future studies with larger sample sizes are needed in order validate our findings.