A Cost Effectiveness Analysis for the Dental Practice: COVID-19 Test Screening by Point of Care (POC) Versus Rapid Reverse Transcriptase Polymerase Chain Reaction (RT-PCR)

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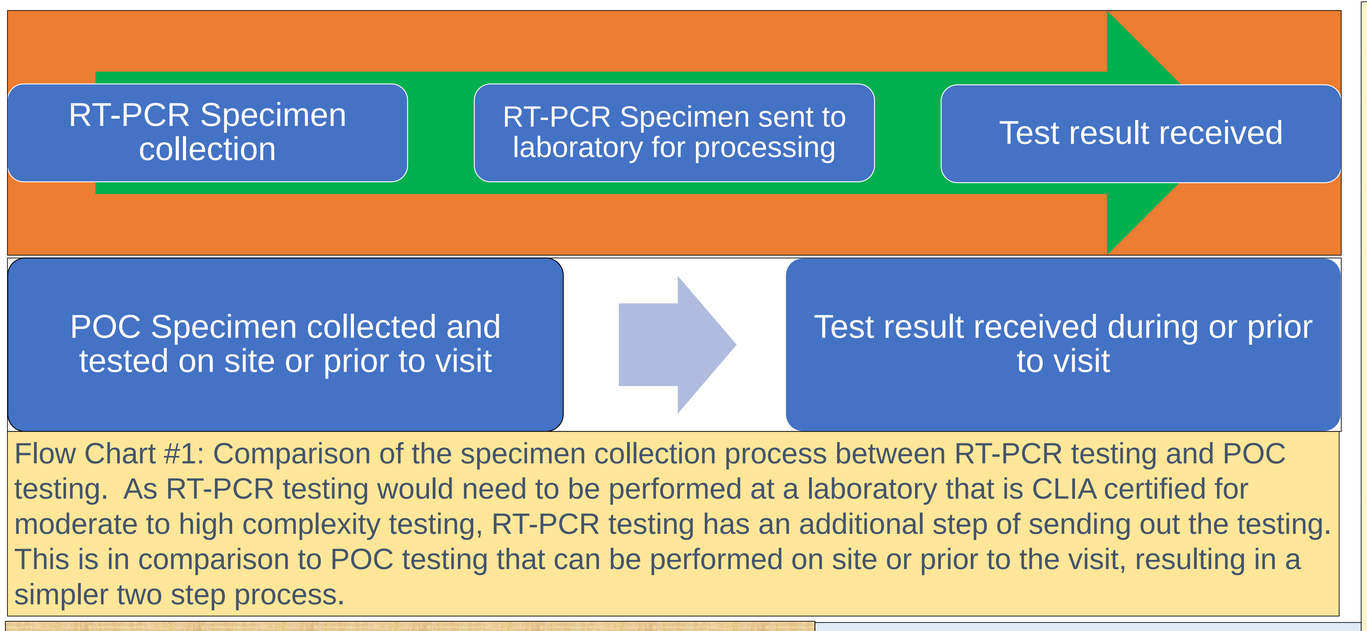
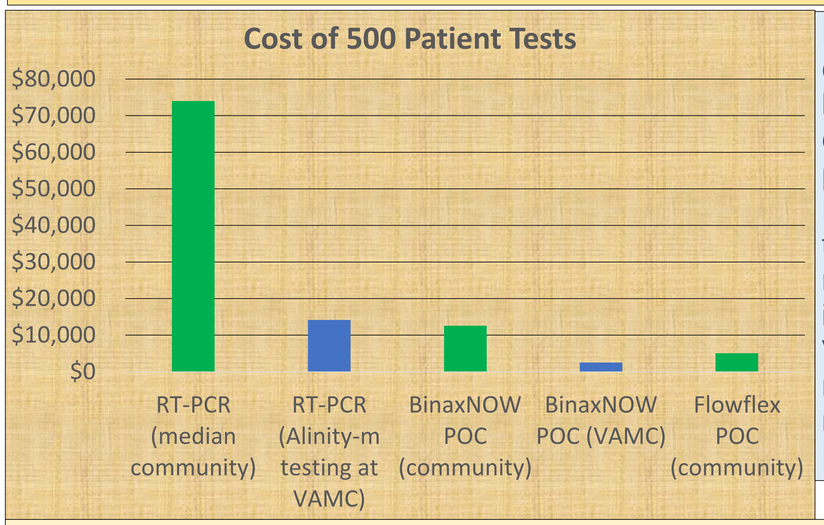
Introduction: Preprocedural COVID-19 testing prior to aerosol generating procedures may reduce infection risks to both providers, staff members, and other patients in the busy dental practice. Point of care (POC) testing and screening of patients for COVID-19 is therefore considered by the American Dental Association (ADA) to be within the dentist's scope of practice. Given the ongoing pandemic, the ADA has previously released the COVID-19 & lab Testing Requirements Toolkit to help guide dental practices in their COVID-19 screening testing decisions. Testing platforms to detect the presence of COVID-19 infection include antigen based POC testing and reverse transcriptase polymerase chain reaction (RT-PCR) to detect viral ribonucleic acid (RNA). However, a cost analysis between RT-PCR and POC COVID-19 assays is scarce in the literature. Therefore, we sought to explore the costs of COVID-19 assays, both at a regional Veteran Affairs Medical Center (VAMC) and in the community, for a cost effectiveness study of relevance for preprocedural testing.

Methods: A review of cost information for COVID-19 RT-PCR and POC testing at a VAMC and in the community was performed. VAMC assay costs examined include the Alinity-m SARS-CoV-2 RT-PCR assay and BinaxNOW POC antigen-based assay (both Abbott, Chicago IL) along with Cepheid Xpert-Xpress-CoV-2-Flu-RSV-Plus RT-PCR assay (Cepheid, Sunnyvale CA). Outside of the VAMC, noted was the median cost of RT-PCR testing (from the Peterson-KFF Health System Tracker) and selected POC assay quoted prices.



Flow Chart #1: Comparison of the specimen collection process between RT-PCR testing and POC testing. As RT-PCR testing would need to be performed at a laboratory that is CLIA certified for moderate to high complexity testing, RT-PCR testing has an additional step of sending out the testing. This is in comparison to POC testing that can be performed on site or prior to the visit, resulting in a simpler two step process.



Bar Chart 1: A graphical representation of the cost to perform 500 patient tests based on known costs. Costs for the community gathered from publicly published costs. The median cost of 500 RT-PCR assays is significantly greater than the cost of 500 POC assay regardless of whether it was performed in the community or at the regional VAMC. Abbreviations: RT-PCR = reverse transcriptase polymerase chain reaction, VAMC = Veteran Affairs Medical Center, POC = point of care.

Results: Test costs at the VAMC (not including technologist time and universal instrument consumables) was $28.34 (Alinity-m), $68 (Cepheid), and $5 (BinaxNOW). The median community RT-PCR assay price was $148, and the Abbott's quoted BinaxNOW price was $25. POC antigen-based testing by BinaxNOW cost was 82% and 92% less than the Alinity-m and Cepheid assays' cost at the VAMC, respectively. In the community, COVID-19 testing by BinaxNOW POC was 83% cheaper than by RT-PCR. This trend continues with other POC assays such as Flowflex (ACON Laboratories, San Diego CA), iHealth (iHealth Labs, Sunnyvale CA), and On/Go Rapid (Intrivo, Santa Monica CA) which are 93%, 89%, and 84% cheaper respectively, based on published prices in May 2022.

Discussion: POC assays have previously been demonstrated to be a potential quick and accurate alternative to RT-PCR assays for primary care screening for COVID-19 disease. Although RT-PCR remains considered the gold standard test for diagnosis, for mass screening POC assays are significantly more economical. In addition, POC antigen-based assays can generally be performed either at home or as a waived test at a medical facility such as a dental clinic. The cost differential between POC and RT-PCR assays is further increased when one considers that RT-PCR assays must be performed in CLIA-certified laboratories for high and moderate complexity assays, which would also include the additional time to send a testing specimen to the laboratory. Even without this consideration, a COVID-19 screening program for a dental clinic based on POC assays would be significantly less expensive (82-93% by the assays reviewed) than a screening program based on sending specimens for RT-PCR testing.

Conclusion: POC assays with reasonably high sensitivity, specificity, and reliability are significantly cheaper than RT-PCR assays. POC assays, particularly those that can be used for testing at home, may be utilized as waived testing conveniently at either the dental practice or – in the case of the assays suitable for at home testing – as testing by the patient at home prior to the dental visit. POC assays are a cost effective and solid testing method for dental clinics seeking a preprocedural screen for COVID-19.

References:

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