



**Review Article**

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## Extensive Saliva based COVID-19 testing – the way forward to curtail the global pandemic?

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### Abstract

With over 36 million people infected with COVID-19 since the beginning of the pandemic, testing has been most challenging process to identify and isolate individuals who are COVID-positive. The RT-PCR testing method has been the gold standard testing tool with a sensitivity and specificity of 95.2% and 98.9% respectively. However, this comes at a huge cost of the stress and anxieties of the testing process itself, especially for children as well as the requirements of health care professionals with PPE kits and the dangers of an aerosol generating procedure. We hence recommend the saliva testing kits as the suggested way forward to testing for the general population, especially for children, as they are highly sensitive and specific (98% and 91% respectively) as well as can be a much effortless process to test for COVID-19 and could certainly pave the way forward to mass testing as some countries are already planning to implement.

**Keywords:** SARS-CoV2, COVID-19, Pandemic, Saliva based test.

### COVID-19 - The inordinate pandemic of 21st Century

Since the initial reported cases of the novel corona virus, now officially called SARS-CoV2 emerged from Wuhan seafood market in China during December 2019, Corona Virus Disease-19 (COVID-19), has now spread rapidly across the globe affecting nearly every country in the world. It has now infected over 36 million people worldwide and caused more than a million deaths globally.

Rigorous restrictions to social interactions, curbing of travel, changed working patterns, a pause on sporting and educational activities imposed by governments across the world has crippled the world economy including and not limited to the travel, tourism and leisure industries which have been the worst affected.

### Common testing methods

The prevalence rate of asymptomatic infections was reported in up to 69% in a meta-analysis by Kronbichler et al<sup>1</sup>. An effective control of community spread can perhaps only be achieved by extensive testing for the virus. The World Health Organization (WHO) endorsed this view in March 2020 but unfortunately testing rates varied widely among different nations and was reliant on various factors including health care testing resources as well as a political will and leadership.

Currently the most popular COVID-19 testing methods used around the world are blood-based antibody testing and Rapid Molecular Assays comprising RT-PCR test using nasopharyngeal and oropharyngeal swabs with RT-PCR being the preferred diagnostic tool in most places<sup>2</sup>. The average sensitivity with the RT-PCR method was 95.2% with a specificity of 98.9% and hence this is perhaps the current gold standard method of testing for COVID-19<sup>3</sup>.

### The challenge of COVID-19 testing in children

COVID-19 testing for children has become more of a challenge now especially as schools reopened and testing being a mandatory requirement prior to starting school for children and teachers in most places. Testing has also become compulsory requirement prior to air-travel, conducting surgical procedures or group sporting activities.

Children face a lot of anxiety and distress especially while having the RT-PCR nasopharyngeal swabs, with reports of pain, epistaxis and nasal trauma during the testing process. This can be quite stressful for parents and challenging for medical providers administering the test too.

### What is saliva-based testing?

Saliva was shown to contain live COVID-19 viruses pooling from the lower respiratory tract, nasopharynx and salivary glands<sup>4</sup> making the testing of saliva for SARS-CoV2 a scientifically viable option as the content

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of COVID-19 in the saliva has been shown to be quite high in the first week of the disease.

Saliva-based testing is simple to perform and can be done by the general public without any formal training necessary. The test is non-invasive as well as a non-aerosol generating procedure as compared to the RT-PCR nasopharyngeal swab test. Hence it is a much safer as well as an easier alternative for both the patient and the healthcare worker.

The saliva testing kits have been shown to be very effective with a sensitivity rate of 98% and a specificity rate of 91%<sup>5</sup>. This has found to be very close to the detection rates of RT-PCR assays.

The recent prospective COVISAL study has indicated a definite advantage in terms of mass screenings<sup>6</sup>. A second study - SALICOV comparing nasopharyngeal and saliva samples from the same patient was launched in May 2020 at the Centre Hospitalier Universitaire, Amiens, France and is due to be completed in December 2020<sup>7</sup>. Results of this study is awaited with eagerness.

### **What makes Saliva testing better?**

There are several advantages with the saliva sampling test. The simplicity of the testing method wherein the patient can collect the sample at home with minimal exposure to health care settings, thereby reducing the risk of nosocomial infections offers a huge advantage to the general population. It is less invasive and a lot more convenient for patients. It also reduces the need of health care professionals as well as the requirement of PPE kits to collect the samples and hence gives a clear edge over the commonly used RT-PCR nasopharyngeal swab tests. Children are obviously much less anxious and less stressed with the saliva-based testing method. The waiting time for sample collection would obviously be a lot less with the saliva testing kits. The saliva specimen is fast, easy and cheap to collect and hence recommended to be implemented in large scale epidemiological testing processes.

COVID-19 has been detected in saliva for up to 25 days after the onset of infection and hence this could also be considered as a tool to monitor viral clearance.

Several countries have now planned to introduce the saliva-based COVID-19 testing for mass screening. In Qatar, the Ministry of Public Health (MOPH) has announced plans to introduce saliva-based COVID-19 tests for children as part of a national testing programme to gain a better understanding of infection rates in the country.

Initially, MOPH is planning to work in collaboration with Hamad Medical Corporation and Primary Health Care Corporation to carry out tests for all students in both government and private schools in Qatar and it will be interesting to find out the outcome of this population-based testing programme<sup>8</sup>.

### **Recommendation**

Considering the advantages in terms of cost savings on human resources as well as material resources along with good patient compliance, we suggest that comparative studies about the efficacy of various saliva testing kits are reviewed urgently and health care organisations globally implement extensive saliva-based testing as an alternative to the current nasal and oropharyngeal RT-PCR testing kits.

### **Conflict of Interest**

None declared.

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