



COVID-19 testing in the post-emergency period

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Three years after the World Health Organization (WHO) declared coronavirus disease 2019 (COVID-19) a pandemic, its director-general Tedros Adhanom Ghebreyesus has announced to the world that this infectious disease should no longer be considered a Public Health Emergency of International Concern (PHEIC), though also affirming that this new status should convince the community that vigilance must not diminish (1,2).

The first and obvious consequence of this decision, which was motivated by the undeniable decline in COVID-19 deaths and hospitalizations, is that severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) testing may now be viewed by many as an outdated and even counterproductive practice. However, there are several reasons that should convince the scientific community, public health authorities, and even policymakers that COVID-19 diagnostics remains an extremely valuable tool in the fight against this still life-threatening infectious disease.

First and foremost, the epidemiological burden of COVID-19 has not yet ended. At the time of writing (i.e., August 2023), WHO is still reporting 296,000 new official weekly diagnoses with nearly 300 COVID-19-related deaths per week worldwide (3), numbers that may be significantly underestimated due to a dramatic burden of undertesting and/or underreporting (4). Therefore, COVID-19 remains a public health problem that should be adequately addressed through regular testing and diagnosis aimed at limiting viral circulation and the associated clinical, social, and even economic burden. In addition to the organic damage caused by an acute and/or persistent SARS-CoV-2 infection,

there are now several indications that a large number of individuals may be affected by long-COVID, commonly defined as persistence of some signs and symptoms of SARS-CoV-2 infection in the period after the acute phase. A recent study estimated that up to 23% of all individuals recovering from SARS-CoV-2 infection may have post-acute sequelae (5). Although this rate decreased after the emergence of the Omicron lineages, the percentage of individuals with prolonged illness remains substantial, at approximately 17%.

Not only is the number of new COVID-19 diagnoses still extraordinarily high, with little variation between seasons because of virus's adaptations to adverse environmental conditions (6), but the number of infected people seeking hospital care remains substantial. Discontinuation of testing could therefore pave the way for the spread of the virus and place a greater burden on the healthcare system, as several recent studies have shown. Regarding the former aspect, Zheng *et al.* estimated that timely SARS-CoV-2 testing of the population living within nearly 2 km of newly identified COVID-19 cases could stop or even prevent potential outbreaks (7).

The basic concept that increasing the number of tests helps to contain pressures on health care was also clearly demonstrated in the study published by Neilan and colleagues (8). In short, in a typical epidemic scenario, routine SARS-CoV-2 testing was found to be associated with superior clinical benefits compared with testing only in hospitalized patients, with reductions in hospital and intensive care unit (ICU) bed occupancy of 2.8 and

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Table 1 Leading motivations for not discontinuing COVID-19 testing in post-emergency period

Limiting the epidemiologic burden of COVID-19
Preventing long-COVID
Minimizing healthcare pressure due to COVID-19 related hospitalizations
Predicting the emergence of new lineages
Differential diagnosis with other (infectious) respiratory infections
COVID-19, Coronavirus Disease 2019.

2.6 times, respectively.

When the cost per test was less than \$3 UD, test performance became more cost-effective compared with no test performance. In a follow-up study, Pak *et al.* examined the impact of discontinuing SARS-CoV-2 testing at hospital admission in England and Scotland, and reported that the number of new hospital cases per community-onset COVID-19 admissions increased between 32–72% after removing this practice (9). In another study, Deng *et al.* examined the risk of COVID-19-related hospitalizations during different test periods (10), and reported that the ratio of infection to hospitalization was the lowest during an intense test period followed by proper isolation. Another study showed that the percentage of positive SARS-CoV-2 tests predicted with high accuracy the number and peak of new ICU admissions for COVID-19, with a prediction of approximately 11 and 14 days, respectively (11). Then, Kanno *et al.* accessed the Our World in Data database to collect information on the association between tests and COVID-19-related mortality in 27 different countries (12), demonstrating a highly significant association between cumulative tests and deaths ($r=-0.59$; $P<0.001$). In a similar study, Wei *et al.* found a highly significant correlation between SARS-CoV-2 testing and population mortality for COVID-19 in 36 Organization for Economic Development (OECD) countries ($r=-0.79$; $P<0.001$) (13).

Another important aspect is that high testing rates not only provide reliable estimates of prevalence of SARS-CoV-2 strains, but also enable the timely identification of new variants, thereby influencing the accuracy of genomic surveillance programs (14).

Differential diagnosis with other respiratory infectious diseases is another important aspect to consider. After most preventive measures (e.g., face covering, social distancing, etc.) were lifted around the world, respiratory virus infections have increased dramatically. Thus, the whole

world is facing the new threat of a so-called “triple-demic”, sustained by SARS-CoV-2, influenza, and respiratory syncytial virus (RSV) (15). For this reason, COVID-19 testing will retain a paramount clinical value, possibly in conjunction with combined detection of influenza and RSV, for delivering the most appropriate care to the patient based on the responsible pathogen(s).

Regarding the testing strategy for managing the future of this pandemic, several studies have convincingly shown that SARS-CoV-2 antigen testing in conjunction with molecular assays conducted in exposed individuals who are antigen-negative despite of symptoms, appears to be the most cost-effective approach compared with molecular or antigen testing alone (16,17).

In summary, while COVID-19 is undoubtedly no longer the “monster” it was at the beginning of this pandemic, there are several important aspects that argue for not abandoning testing for SARS-CoV-2, as summarized in *Table 1*, and which primarily include limiting the epidemiologic burden of COVID-19 and long-COVID, minimizing the public health burden of hospitalizations associated with COVID-19, anticipating the emergence of new lineages, and, last but not least, making an efficient differential diagnosis with other (infectious) respiratory conditions.

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