

THE CRITICAL ROLE OF DIAGNOSTICS IN COVID-19 MANAGEMENT

Introduction to the webinar:

APACMed hosted a webinar on 31st March 2021 to discuss the critical role of diagnostics in COVID-19 management. The event was timely given the backdrop of the COVID-19 pandemic and continuously evolving policies to contain the spread across the Asia-Pacific (APAC) region. Testing has been successfully used to reduce the strain on healthcare systems and contain the spread of the virus and remains central to good management of the pandemic alongside ongoing vaccine dissemination and the gradual re-opening of economies in the APAC region and globally.

The purpose of the session was to share the white paper co-produced by APACMed and L.E.K. Consulting's Life Science Center of Excellence outlining recommendations for the integration of COVID-19 testing strategies and share perspectives with medical associations and professional societies so that the recommendations can be incorporated in discussions with governments across the APAC region.

The session opened with remarks from Georgia Swan (Manager, Government Affairs & Market Access, APACMed) and Harjit Gill (CEO, APACMed). Stephen Sunderland (Partner, L.E.K. Consulting) and Arathi Sasidharan (Partner, L.E.K. Consulting) presented a summary of the four key themes from the white paper.

Finally, there was a moderated discussion with experts in the field: Prof. Rosanna Peeling (Chair of Diagnostics Research, London School of Hygiene and Tropical Medicine), Dr. Alex Cook (Vice Dean (Research), NUS Saw Swee Hock School of Public Health), Dr. David Powell (Medical Advisor, International Air Transport Association (IATA)), and Dr. Kelvin To (Clinical Associate Professor, University of Hong Kong).

Key challenges in current COVID-19 diagnostics:

Dr. Powell and Prof. Peeling noted the rapid development of more than 1,000 diagnostic tests to address the COVID-19 crisis, recognising a great effort that involved a wide range of stakeholders.

Challenges remain, however, especially with regards to equitable access to diagnostics. This is primarily the result of supply chain constraints associated with both lab-based and point-of-care (POC) molecular tests since they require significant infrastructure (e.g., instruments).

Antigen tests, on the other hand, can be deployed at large scale with limited infrastructure requirements, which can improve access. In some circumstances, for example with frequent testing, antigen tests can also deliver similar effective performance to molecular tests. There is, however, a prevailing scepticism towards antigen testing that needs to be addressed to enable large-scale adoption.

This scepticism also extends to other methods of sample collection, such as saliva swabs, as an alternative to nasopharyngeal swabs.

Dr. To and Prof. Peeling also spoke of the uncertainty around decisively determining the right testing strategies for a given population/setting because of limited evidence on which testing methods work best in different situations. This uncertainty impacts policies on testing strategies, required quarantine periods, reopening of economies and travel resumption.

Using a range of tests and strategies to fit the situation:

In addition to the recommendations listed in the white paper such as testing of high-risk groups, targeted isolation, and pre-event testing, additional considerations complementing these recommendations were raised in the webinar.

Prof. Peeling highlighted the importance of differentiating testing strategies based on intended use as a confirmatory diagnostic test vs. a public health tool.

A confirmatory diagnostic tool is to confirm or rule-out COVID-19 infection in a suspected case or high risk/high-interaction setting. Key requirements for such tests would include high sensitivity to provide a

confirmatory result. In this regard, Dr. To shared an example of molecular tests being used to identify suspected COVID-19 cases among high interaction groups (e.g., restaurant staff) in Hong Kong.

A public health tool would entail testing large asymptomatic populations to ensure a safe environment for schools and mass gatherings. The key characteristics of such tests would include low cost, non-invasive, pervasive etc., thus differing from the needs of a confirmatory diagnostic tool. Dr. Cook shared an example of the cruise industry using antigen tests to ensure absence of cases among passengers prior to boarding, allowing re-opening of the “Cruise to nowhere” rides in Singapore.

Managing variants:

Prof. Peeling and Dr. To also noted the importance of antigen tests in the context of identifying variants so that isolation and contact tracing can be put into place to interrupt the chain of transmission of COVID-19 variants - such as B.1.1.7, 501Y.V2 and P1 - which can be associated with higher transmission rates.

A key concern is that many molecular tests target the SARS-CoV-2 spike protein, and that since the most common variants carry mutations in the spike protein then some molecular tests may be less sensitive when encountering these variants.

Most antigen tests, however, target the nucleocapsid protein, so it is likely that these tests will continue to be effective in identifying those infected and actively at risk of shedding the variant virus. While it is not feasible or cost effective for most countries to sequence all the emerging variants, it is essential to expand testing capacity to determine the infective cases and control the transmission.

Resuming international travel:

Resumption of travel is one of the focal points for governments trying to restore normalcy to economies, and careful consideration is required in establishing appropriate strategies.

Testing:

A key issue is to reduce potential ‘blind spots’ that come with any form of testing. For example, current policies in many countries require travellers to take a molecular test shortly prior to travel, typically 2-3 days that allows for the 12 to 24-hour turnaround typically required for molecular tests. There is a risk, however, that travellers are exposed to COVID-19 in the time between their test and actual travel. In this context, antigen tests with turnaround times of as little as 15 minutes can be useful to reduce the ‘blind spot’.

Alternative testing approaches, such as breathalyser and canine detection, also show potential but are currently still in development stage. Their feasibility of use in complex real-world environments such as airports is yet to be well understood.

Dr. Powell and Dr. Cook shared the importance of the time to result of testing methods that are utilized for travel. An important complication is that travel hubs, such as airports, typically have high-density and flow rates of passengers, so when establishing testing it is critical to consider passenger flow to determine the required test turnaround times.

Interoperable apps:

Dr. Powell further shared that interoperable apps are being designed to match the requirements of destination countries against the data (i.e., test results or vaccination status) entered by the passenger or approved agency, while maintaining data privacy. Ensuring the validity and recognition of indicated test results will remain a challenge.

Testing despite vaccines:

The dissemination of vaccines is now a priority for most countries, but the panellists agreed that important aspects of understanding remain unknown, for example the antibody levels conferring effective protection.

Dr. To observed that determining these levels is especially challenging given the current situation of the variations that exist between different test methods, vaccine types, and laboratory capacity / capability between countries and regions.

Dr. Cook also emphasized the importance of testing being continued, to find and contain cases in the unvaccinated population, so that societies can move away from more disruptive policies such as workplace closures and travel restrictions.

Ensuring quality & reliability of tests:

With more than 1,000 COVID-19 diagnostic tests now available, there is a wide range of performance, not based only upon the test themselves, but also the conditions and circumstances of use.

Prof. Peeling and Dr. Cook observed that comparisons between tests and testing strategies were complex and that scenario-specific testing should be carried out to ensure fair comparisons between testing strategies and to ensure reliability.

For example, how well the antigen tests work to detect COVID cases or to ensure a safe environment differ depending on the prevalence of COVID in the population, so it is important to consider test sensitivity and specificity in the scenario in which the test is going to be used (e.g., high or low prevalence of COVID in the population).

Prof. Peeling further shared that the US FDA, World Health Organization, and other organizations such as the Foundation for Innovative New Diagnostics (FINN) are developing ways to systematically validate tests to make informed policy decisions on testing strategies.

Moving forward:

As countries continue to battle the pandemic, the experts agreed that countries should share cases of success and failure of their COVID-19 responses as learnings to inform policies in other regions.

More, and stronger, public-private collaborations can also enable the rapid development of translational research so that new technologies can be rolled out promptly in emergency situations such as a pandemic.

Lastly, the experts highlighted the crucial importance of continuously re-evaluating policies with regards to travel resumption, vaccine roll-out, and economic re-opening, to keep pace with the ever-changing pandemic scenarios in APAC and beyond.

Speakers



Stephen Sunderland is a Partner based in L.E.K.'s Shanghai office. He has two decades of experience. In addition to diagnostics, he advises major multinational companies, midsize companies and investors active in medtech, life sciences and healthcare services on value-maximizing growth strategies. He leads L.E.K.'s China medtech practice



Arathi Sasidharan is a Partner in L.E.K. Consulting's Singapore office with over 10 years of consulting experience. As a member of L.E.K.'s Life Sciences and Healthcare practice, Arathi has worked with clients in Southeast Asia, India and the U.S. in developing growth strategies, go-to-market and commercial strategies, and in providing M&A transaction support.

Panellists



Prof. Rosanna Peeling is currently Professor/Chair of Diagnostics Research at the London School of Hygiene and Tropical Medicine and Director of the International Diagnostic Centre (IDC). Trained as a medical microbiologist, she was Research Coordinator and Head of Diagnostics Research at the UNICEF/UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases (WHO/TDR) in Geneva and Chief of the National Laboratory for Sexually Transmitted Diseases in Canada before assuming her current position.



Dr. Kelvin To is currently a Clinical Associate Professor of the Department of Microbiology at the University of Hong Kong. He obtained his BSc in microbiology from the University of British Columbia, Canada, and earned his medical degree from the University of Hong Kong. He received his specialist training in clinical microbiology and infection at Queen Mary Hospital. He is interested in studying severe respiratory tract infections, especially on COVID-19 and influenza virus. For COVID-19, his research focuses on diagnostic assays, genomic, seroepidemiology, and vaccines.



Dr David Powell is the Medical Advisor to the International Air Transport Association (IATA). IATA is the global body representing the world's major airlines, headquartered in Geneva and Montreal. Dr. Powell is a specialist in occupational medicine whose professional background is mostly in aviation, including as an Air Force flight surgeon, managing medical services for airlines, academic roles and also consulting for a variety of aviation organisations including ICAO (the International Civil Aviation Organisation).



Dr Alex Cook is an Associate Professor in the Saw Swee Hock School of Public Health (SSHSPH) at the National University of Singapore (NUS), where he is also the Vice Dean of Research and the leader of the Biostatistics and Modelling Domain. He also holds joint appointments at the Duke-NUS Medical School Singapore, at the Department of Statistics and Applied Probability, NUS. He works on infectious disease modelling and statistics and on population modelling to assess the effect of evolving demographics on non-communicable diseases such as diabetes.