

A Rapid Review of Surveillance Strategies Against COVID-19

Executive Summary

There is an urgent call by the WHO to scale up efforts to identify, isolate and contact trace. "Effective testing and quarantine measures help ease the pressure on health services, which can quickly become overwhelmed as demand surges for respirators and other critical lifesaving equipment." As this pandemic continues to gain momentum, this paper aims to determine the most efficient surveillance strategy in the Philippines through exhaustive literature review.¹

Recommendations

- **Enhance surveillance strategies**
 - **Change case definition for surveillance.** Approximately 80% of COVID-19 cases experience no or mild symptoms. Enhance surveillance strategy and expand criteria to undergo testing.
 - **Improve testing.** Testing kits should be readily available in all healthcare facilities. Enhance information dissemination on the surveillance criteria to encourage proper voluntary testing.
- **Source for RT-PCR machines and test kits.** Increase and support RT-PCR capable facilities, including in selected regions, to facilitate testing nationwide.
- **Consider serologic tests with better evidence.** Serologic test is used to test the public who are mild to moderately symptomatic. An IgM+IgG solidphase immunochromatography test is recommended
- **Improve contact Tracing.** Support innovations like using mobile phone application data, a centralized contact training unit (similar to the a call-center), linking geographic maps with known positive cases.

Results & Discussion

An exhaustive literature review was done to identify the most efficient strategies for scaling up testing and surveillance. Multiple results were reviewed and the most feasible are presented in the following pages:

¹"The World Health Organization has called on countries to 'test, test, test' for coronavirus - this is why" Accessed March 18, 2020.
<https://www.weforum.org/agenda/2020/03/coronavirus-covid-19-testing-disease/>

a. Testing

NUCLEIC ACID AMPLIFICATION TEST						
TEST	DESCRIPTION	SENSITIVITY/ SPECIFICITY	COST	TURNAROUND TIME	DISADVANTAGES	WHEN TO TEST
Polymerase Chain Reaction	<ul style="list-style-type: none"> WHO recommended² Coronavirus is an RNA virus hence it has to first undergo reverse transcription to DNA and then subsequently amplified for detection. 	*95-97% (protocol dependent)	P1320 – P8500 ** Other costs considered RT-PCR Machine plus consumables	45 mins to 6 hours	Long running time per batch. Expensive and limited PCR machines and authorized users.	As early as time of exposure ** not after symptoms have resolved
SEROLOGIC TESTING (Serologic testing utilizes blood as a sample and can be done at point-of-care with rapid results.)						
IgM+IgG Lateral Flow Tests/ Solid phase immunochromatography assay³	<ul style="list-style-type: none"> Combined IgG and IgM antibody detection 	Sensitivity: 88.66% Specificity 90.63%	Not known	Takes 10- 15 minutes turnaround time	Need more evidence	At least 1 week after onset of symptoms
Xpert Xpress SARS COV 2⁴	<ul style="list-style-type: none"> automated molecular test for qualitative detection Uses CEPHEID GeneXpert system, a system already installed in all regions and some provinces used mostly to test for tuberculosis infection. 	Not known	Not known	45 minutes	Not known	As early as time of exposure **not after symptoms have resolved

b. Contact Tracing

There is no one singular policy on how to effectively trace contacts; different countries have adapted their own strategies on how to conduct contact tracing. Singapore and South Korea stand out in their effective contact tracing methods:

1. Dedicated team for contact tracing^{5,6}
2. Legal mandate⁷⁸
3. Innovation/GPS-based Applications for mapping and monitoring⁹¹⁰

² "Country & Technical Guidance - Coronavirus Disease (COVID-19) " Accessed March 19, 2020. <https://www.weforum.org/agenda/2020/03/coronavirus-covid-19-testing-disease/>

³ "Saw Swee Hock School of Public Health COVID-19 Science Report: Diagnostics " Accessed March 20, 2020. <https://sph.nus.edu.sg/wp-content/uploads/2020/03/COVID-19-Science-Report-Diagnostics-23-Mar.pdf>

⁴ Xpert Xpress SARS COV 2 " Accessed March 25, 2020. <https://www.cepheid.com/coronavirus>

⁵ COVID-19 National Emergency Response Center, Epidemiology & Case Management Team, Korea Centers for Disease Control & Prevention (2020). Contact Transmission of COVID-19 in South Korea: Novel Investigation Techniques for Tracing Contacts. Osong public health and research perspectives, 11(1), 60–63. Accessed March 25, 2020. <https://doi.org/10.24171/j.phrp.2020.11.1.09>

⁶ "Coronavirus: The detectives racing to contain the virus in Singapore" Accessed March 20, 2020 <https://www.bbc.com/news/world-asia-51866102>

⁷ "Infectious Diseases Act - Singapore" Accessed March 20, 2020 <https://sso.agc.gov.sg/Act/IDA1976>

⁸ National Legal Information - Infectious Disease Control and Prevention Act" Accessed March 20, 2020.

<http://www.law.go.kr/LSW/lsInfoP.do?lsiSeq=188080&chrClsCd=010203&urlMode=engLsInfoR&viewCls=engLsInfoR#0000>

⁹ "Singapore launches TraceTogether mobile app to boost COVID-19 contact tracing efforts" Accessed March 20, 2020

<https://www.channelnewsasia.com/news/singapore/covid19-trace-together-mobile-app-contact-tracing-coronavirus-12560616>

¹⁰ "South Korea turns to tech to take on Covid-19" Accessed March 18, 2020 <https://asiatimes.com/2020/03/south-korea-turns-to-tech-to-take-on-covid-19/>

SURVEILLANCE STRATEGIES

	Active Surveillance in general population	Active Surveillance in "high risk" groups	Testing only those symptomatic or with severe symptoms	Syndromic Surveillance
Description of how it may be applied to COVID-19	Mass testing of the general population regardless of symptoms	Conducting testing on ALL high potential COVID-19 cases, not just those symptomatic and/or with exposure	Testing only those symptomatic and with exposure. Another strategy is testing only those with severe symptoms within that group	All patients with influenza-like illness will be treated as COVID cases.
How it was implemented in other countries	South Korea <ul style="list-style-type: none"> - widespread mass testing, Immediate isolation, rapid and massive contact tracing, and quarantine of contacts was done. - No community-wide lockdowns implemented, but social distancing was enforced. Vo Euganeo town, Italy¹¹ <ul style="list-style-type: none"> - population-wide testing, isolation of cases, quarantine of close contacts, widespread re-testing to capture the false-negatives 	Singapore <ul style="list-style-type: none"> - unified case definition and mandated notification of any suspected or confirmed case through centralized notification system, enhanced surveillance among potential cases, Contact tracing of all confirmed cases. Active close monitoring of contacts for symptoms, and immediate hospitalization, isolation and testing once symptomatic. - No community-wide lockdowns implemented, but social distancing was enforced. 	Current strategy in several countries including the Philippines .	Main strategy implemented for SARS. - All suspected cases were isolated once symptoms started, and thus, secondary transmission could be prevented.
Results	Decreasing number of new cases. Low death rates compared to other countries ¹²	High detection rates.	Increasing clusters of outbreak spreading to other areas, high number of confirmed cases that cannot be linked to an exposure.	N/A
Advantages	Highest sensitivity (High % of cases captured by the surveillance)	Higher sensitivity than simply testing those symptomatic (More cases will be captured).	Low number of test kits required, and can be reserved for those at highest risk.	Does not require testing, so can be immediately acted upon locally
Disadvantages	Should be implemented very early on, otherwise may be impossible to trace all contacts already.	Requires massive contact tracing to be effective.	Low sensitivity, a lot of missed cases.	COVID-19, transmission has been shown to start even before symptoms occur.

¹¹ "How one small Italian town cut coronavirus cases to zero in just a few weeks" Accessed March 21, 2020
https://www.google.com/url?q=https://asiatimes.com/2020/03/why-are-koreas-covid-19-death-rates-so-low/&sa=D&ust=1585312435157000&usg=AFQjCNFBPMn1pK3AKhM9X3ErDYVSJ_wJVQ

¹² "How one small Italian town cut coronavirus cases to zero in just a few weeks" Accessed March 21, 2020
https://www.google.com/url?q=https://asiatimes.com/2020/03/why-are-koreas-covid-19-death-rates-so-low/&sa=D&ust=1585312435157000&usg=AFQjCNFBPMn1pK3AKhM9X3ErDYVSJ_wJVQ

Recommendations

1. Enhance surveillance strategies

a. Change case definition for surveillance

Currently, the surveillance strategy is to test only those who have confirmed exposure from international travel and/or close contact with a confirmed case, and are either experiencing severe symptoms or are considered part of the high-risk group. However, this strategy leads to cases being missed out if they do not fit the criteria. Based on studies in other countries, approximately 80% of COVID-19 cases experience no or mild symptoms, and if these cases are not appropriately isolated, it can lead to succeeding generations of outbreak clusters. Although the enhanced community quarantine was implemented to prevent this spread, the widespread quarantine cannot be sustained for an extended period of time. Thus, there is a need to look into alternative strategies in the long run.

It is recommended that an enhanced surveillance strategy be implemented, with expansion of the criteria to undergo testing for COVID-19 to include:

- (1) all symptomatic persons with epidemiologic links to COVID-19;
 - (a) All patients with symptoms identified with COVID such as Fever and/or cough, difficulty of breathing and other respiratory illnesses
 - (b) All patients (regardless of symptoms) with identified close contact to a COVID-19 positive case
- (2) high-risk groups, including any of the following: people ages 60 years and above, those with comorbidities,
- (3) patients admitted in the ICU with possible infection of unknown etiology
- (4) patients presenting with pneumonia
- (5) frontline healthcare workers.

b. Improve testing

Tests should be done as soon as the person is identified by the healthcare provider, and thus, testing kits should be readily available in all healthcare facilities. Requests for the test should be accompanied by a completed requisition form detailing the criteria met by the person being tested to ensure that the algorithm is followed.

Information dissemination on the surveillance criteria should be enhanced so that the general public is aware of when they would qualify for testing, supported by a hotline that they can call to confirm if they can get tested, and where they can get tested.

Specimen collection should be done in facilities that would ensure very minimal exposure of the potential case to others, including the healthcare workers. Some innovations on this front include the set-up of a drive-through testing site, or simply setting up a part of the health facility or repurposing local clinics to be dedicated for specimen collection. The more testing sites locally available, the more people can be tested, without overwhelming the hospitals with persons under investigation for testing.

2. Source for RT-PCR machines and test kits

Currently, the standard for testing patients is through RT-PCR. The Philippines is procuring the kits for distribution across the country to collect samples however these samples must still be sent to RT-PCR ready laboratory. It is therefore recommended that scaling up measures include increasing the availability of RT-PCR kits for processing at the same time increase the number of laboratories able to process these kits. The more hospitals that are able to conduct their own RT-PCR, the quicker tests can be processed and effectively improve diagnosis and discharge. There should be RT-PCR capable facilities in other selected regions in the Philippines to facilitate testing from provinces.

3. Consider serologic tests with better evidence

It is recommended that a serologic test be used to test the public who are mild to moderately symptomatic. An **IgM+IgG solidphase immunochromatography test** is recommended for point of care use for the public who present with mild to moderate symptoms. Being able to separate the COVID + patients can enhance contact tracing and improve guidelines for quarantine.

4. Improve contact Tracing

- a. The use of mobile phone application data may be utilized to enhance identification of other possible contacts, subject to the Data Privacy Act, and with compliance of the case.
- b. A centralized contact training unit can be put in place, similar to the functions of a call-center.
- c. Link data maps with actual geographic maps of known positive cases and present to the public. This information may increase the public's awareness in where the virus is seen active. They can then voluntarily call a hotline when they start to show symptoms and are in a known "hotspot".

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