ISLAMIC REPUBLIC OF AFGHANISTAN
MINISTRY OF PUBLIC HEALTH

SCIENCE, EPIEMDIOLOGY AND RESEARCH COMMITTEE TO FIGHT COVID-19

ISSUE 05

POLICY BRIEF

COVID-19 Testing Rationalization in Afghanistan

23/04/2020

Policy Statement

This brief on COVID-19 testing is designed to support policy discussion on different type of testing and priority targets groups for COVID-19 case reporting.

Background

In late December 2019, a cluster of patients was admitted to a hospital in Wuhan, Hubei, China with initial diagnosis of pneumonia and unknown etiology. These patients were epidemiologically linked to a seafood and wet animal wholesale market (Bogoch, 2020) and (H. Lu, 2020). Early reports predicted the onset of a potential Coronavirus outbreak given the estimate of a reproduction number for the 2019 Novel (New) Coronavirus (COVID-19, named by WHO on Feb 11, 2020) (S. Zhao, 2020). Emerging COVID-19 disease in China alarmed the risk of transmission to other countries and the World Health Organization (WHO) recommended countries to be prepared for proper response against COVID-19 (WHO S. R., 2020).

Early detection through valid testing mechanism is a critical component of tracking and combating the COVID-19 pandemic. The incubation period of SARS CoV-2 varies from person to person and studies found that it is ranged from 2.1 to 11.1 days with mean incubation period of 6.4 days (95% CI 5.6-7.7) (Backer Jantien A , Klinkenberg Don , Wallinga Jacco, 2020). Stephen A. Lauer et al estimated the median incubation period to be 5.1 days (95% CI, 4.5 to 5.8 days), and 97.5% those who develop symptoms will do so within 11.5 days (CI, 8.2 to 15.6 days) of infection. These estimates imply that, under conservative assumptions, 101 out of every 10 000 cases (99th percentile, 482) will develop symptoms after 14 days of active monitoring or quarantine (Stephen A. Lauer et al, 2020). Undetected exposed individuals put others at risk of getting COVID-19 disease through social interaction or community contact. Early and reliable test could track COVID-19 and identify hidden hot spots. Focusing testing on symptomatic individuals may overlook those who are already infected but are asymptomatic.

At the time of writing this brief, a total of 7070 PCR tests have been applied to the suspected cases in Afghanistan. Based on WHO situation report, the first case of COVID-19 in Afghanistan was identified in February 24, 2020 followed by three cases identified in March 08, 2020. The cases were sporadic and until end of March they become clustered. As of April 22, there were a total of 1226 confirmed cases throughout the country (WHO, COVID-19 situation report 95, 2020). Currently there are 6 laboratories offering real time PCR to diagnose COVID-19 patients and a total of 68 GeneXpert machines with the capacity of diagnosing COVID-19 through direct gene detection. The later technique, established for TB testing, has not been recruited to diagnose COVID-19 in Afghanistan so far.

Types of COVID-19 test kits

For the time being several testing kits are available in the market or are in their development phase. The most commonly used tests are manual molecular assay which detect the virus genetic material in the liquid sample taken from suspected case of COVID-19. This test requires three different set of materials/equipment: an RNA extraction kit, a PCR assay mixture, and a polymerase chain reaction or

PCR machine that runs the test. Moreover, these test kits require skilled lab technician in a laboratory setting.

There are also automated molecular assays, where the whole process is conducted by machine such as Cepheid's GeneXpert system, Roche's cobas 6800/8800 systems, Abbott's m2000 RealTime system, and the BD MAX System. In addition, there are two types of rapid diagnostic test kits that detect viral particles in the nasal secretion (actively infected person) and/or antibodies in the blood of someone who has been infected with the virus (detecting people who have been exposed to the virus at some point). There are also antibody-based or antigen-based tests that use enzyme-linked immunosorbent assays or ELISAs. But these are laboratory-based assays and not for point-of-care use.

Some bottlenecks of different test kits

Based on countries' financial capability, laboratory capacity and access, different countries are using various mixtures of these testing kits. Few options of rapid test are available globally, as compared to several manual molecular tests available in the market. The need for a complex infrastructure and system is one of the limitations to widely use such test kits. Since different kits needed to run this test can come from different manufacturers, it will impose the logistical challenges. Furthermore these test kits require chemical reagents that put countries in difficult situation to secure them. Manufactures of these reagents are located in few high income countries and most of them have been asked by their home countries to maintain the local demand first. This can lead every country to struggle fulfilling the demand of test kits. As it concern for the timing the manual molecular assay tests can take 3-4 hours, but the number of machines, personnel, and testing volume can affect this.

Given the facts that automated molecular assays will reduce the demand for PCR test reagents/kits, but they can be costly to purchase and maintain. However, in Afghanistan there are almost 68 GeneXpert machines which are being used for diagnosis of Tuberculosis infections. To repurpose them for SARS-CoV-2 diagnosis, additional cartridges are needed which cost about US$20 per test. This automated test requires less than one hour and even some of them requires only five minutes for diagnosis.

Rapid test kits seem to be more practical for larger scale, mass screening programs. The weak point of these kits is that most of them are waiting for validation approval by relevant authorities, e.g. FDA, and could accurately detect only 30% of the COVID-19 cases. Considering the limitation of these test kits their results must be interpreted with much caution.

Who will be tested

Afghanistan is a country which mostly relies on donor funding and has limited number of laboratories with the capacity to diagnose COVID-19. Therefore, it will not be possible to implement mass screening programs in the country. The target groups should be prioritized and focus should be paid to those with higher risk. These priority target groups are:

1. Individuals who have COVID-19 advance symptoms such as fever, cough and dyspnea (shortness of breath) and are hospitalized;
2. Health care workers (doctors, nurses, midwives, support staff, …) who are in direct contact with known COVID-19 patients;
3. Health care workers in facilities who has the symptoms of the disease;
4. Patients with highest risk of complication;
    a. Patients 56 years of age and older with symptoms
    b. Patients with underlying conditions with symptoms
        i. People with chronic lung disease or moderate to severe asthma
        ii. People who have serious heart conditions
        iii. People who are immune-compromised
            - Many conditions can cause a person to be immune-compromised, including cancer treatment, smoking, bone marrow or organ transplantation, immune deficiencies, poorly controlled HIV/AIDS, and prolonged use of corticosteroids and other immune weakening medications.
        iv. People with severe obesity (body mass index [BMI] of 40 or higher)
        v. People with diabetes
        vi. People with chronic kidney disease undergoing dialysis
        vii. People with liver disease
    c. First responder with symptoms
    d. Pregnant women with symptoms
5. Family member of known COVID-19 patients with sign and symptoms who are in close contact;

Access to testing laboratory will be gradually expanded to individuals who are working in high risk environment for example infrastructure workers with symptoms; individual who meet any aforementioned categories with symptoms; health care facility worker and first responders; individuals with mild symptoms in communities experiencing high number of COVID-19 hospitalization.

Case Definitions

Symptoms of COVID-19 are non-specific and the disease presentation can range from no symptoms (asymptomatic) to severe pneumonia and death. COVID-19 is a mild to moderate illness for approximately 80% of individuals; 15% are severe infection requiring supplemental oxygen; and 5% are critical infections requiring mechanical ventilation (WHO, www.who.int, 2020). People with COVID-19 generally develop signs and symptoms, including mild respiratory symptoms and fever ~5 days after infection (mean incubation period 5-6 days, range 1- 14 days) (Zhi, 2020).

Some policy issues related to COVID-19 testing

- All COVID-19 tests will be free of charge in health care setting.

- Since there is a huge demand for COVID-19 test in the country, the priority will be given to those who are most at risk of infection and listed above.
- Before applying any test, it is advisable to evaluate any suspect case clinically and then refer them to laboratory test subjected to availability of test.
- Testing for COVID-19 will be carried out in health care facilities dedicated for COVID-19 and before applying test, a proper screening procedure should be applied to reduce unnecessary testing.
- For the time being, the only available testing procedure is the real time PCR; therefore it make sense to first maintain and increase the amount of reagents of this machine. In addition, procuring and securing GeneXpert cartridge should be speeded up to avoid shortage of valid test.
- Expanding testing capacity should be carefully assessed. One option could be to select rapid test kits that has received emergency utilization certificate from FDA. However, such test should be followed by confirmatory test, i.e. PCR or GeneXpert. It is worth noted that rapid test of direct detection of viral particles in the nasal secretion could be used in health care setting while IgG and IgM rapid test could be used only for research and screening purpose.
- Involvement of national and international partners in supply and establishment of new validated testing capacity within the country will be an added value and need to develop strategies for their involvement.
- Data collection and analysis will be processed at MoPH but access to data should be made available to public health researchers to better understand the spread of infection and to inform channeling the resources across the country.

ACKNOWLEDGEMENTS

This policy brief is a technical work of public health experts, epidemiologists and clinical specialists who are voluntary members of Science, Epidemiology and Research (SER) Committee to fight COVID-19 in Afghanistan. The content of this policy brief is intended as an advice to healthcare authorities in Afghanistan during emergency situation. MoPH will consult specialists and technical advisors to avoid any harm before its implementation. The Afghanistan National Public Health Institute (ANPHI) acknowledges the hard work of all committee members, particularly following colleagues who directly contributed in development and finalization of this policy brief.

1. Dr Ajmal SABAWOON, (KUMS)
2. Dr Abdullah ASSADY, (KUMS)
3. Dr Nesar Ahmad HAMRAZ, (AMS)
4. Dr Nooria ATTA, (KUMS)
5. Dr Hafiz RASOOLY (MoPH)
6. Dr Islam SAEED (AFETP/ANPHI)
7. Dr Nabil PAKTIN (MoPH)

References

Backer Jantien A , Klinkenberg Don , Wallinga Jacco. (2020). Incubation period of 2019 novel coronavirus (2019-nCoV) infections among travellers from Wuhan, China, 20–28 January 2020. *Euro Surveil*, 25(5):pii=2000062. https://doi.org/10.2807/1560-7917.ES.20.

Bogoch, A. W.-B. (2020). Pneumonia of unknown etiology in wuhan, China: potential for international spread via commercial air travel. *J. Trav. Med.*, https://doi.org/10.1093/jtm/taaa008.

H. Lu, C. S. (2020). Outbreak of pneumonia of unknown etiology in wuhan China: the mystery and the miracle. *J. Med. Virol. 92 (4)* , 401–402,https://doi.org/10.1002/jmv.25678.

S. Zhao, Q. L. (2020). Preliminary estimation of the basic reproduction number of novel coronavirus (2019-nCoV) in China, from2019 to 2020: a data-driven analysis in the early phase of the outbreak. *Int. J.Infect.Dis. : IJID : Off. Publ. Int. Soc. Infect. Dis. 92*, 214–217, https://doi.org/10.1016/j.ijid.2020.01.050.

Stephen A. Lauer et al. (2020). The Incubation Period of Coronavirus Disease 2019 (COVID-19) From Publicly Reported Confirmed Cases: Estimation and Application. *DOI: 10.7326/M20-050; https://annals.org/AIM/FULLARTICLE/2762808/INCUBATION-PERI*, DOI: 10.7326/M20-050; https://annals.org/AIM/FULLARTICLE/2762808/INCUBATION-PERI .

WHO. (2020, April 22). *COVID-19 situation report 93.* Retrieved from www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports: https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200422-sitrep-93-covid-19.pdf?sfvrsn=35cf80d7_4

WHO. (2020, April 24). *COVID-19 situation report 95.* Retrieved from www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports: https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200424-sitrep-95-covid-19.pdf?sfvrsn=e8065831_4

WHO. (2020, March 06). *www.who.int.* Retrieved from https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports: https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200306-sitrep-46-covid-19.pdf?sfvrsn=96b04adf_2

WHO, S. R. (2020, January 21). *www.who.int.* Retrieved from https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports: https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200121-sitrep-1-2019-ncov.pdf?sfvrsn=20a99c10_4

Zhi, Z. L. (2020). The Epidemiological Characteristics of an Outbreak of 2019 Novel Coronavirus Diseases (COVID-19) in China. *cma.j.issn 41 (2)*, 145–151. DOI:10.3760/cma.j.issn.0254-6450.2020.02.003. Retrieved from The Epidemiological Characteristics of an Outbreak of 2019 Novel Coronavirus Diseases (COVID-19) in China]. Zhonghua Liu Xing Bing Xue Za Zhi. 2020;41(2):145–151. DOI:10.3760/cma.j.issn.0254- 6450.2020.02.003 .