Covid-19 tests: searching a strategy

Press Release of the French National Academy of Medicine and the National Academy of Pharmacy

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After painfully catching up in the ability to test the population to combat the spread of SARS-CoV-2, France has crossed the symbolic threshold of one million RT-PCR tests per week, surpassing its German, Spanish and Italian neighbours in August. However, in the absence of an use strategy, this deliberately quantitative approach has led to a laboratory congestion and an extension of response times, resulting in a disappointing balance sheet in terms of cost - effectiveness and compromising the usefulness of this major tool in the fight against the epidemic [1].

This situation prompted the Ministry of Health, on September 17, to define a "doctrine of prioritization" of tests, including the deployment of centres reserved for priority persons (holders of a medical prescription, symptomatic patients, contact subjects, caregivers and home helpers). However, this corrective measure cannot be sufficient to resolve the bottleneck in the Covid-19 test channels. Indeed, while it has been possible to equip more than 4,000 centres throughout the country to take samples, it is more difficult to increase so rapidly the number of laboratories authorized to perform RT-PCR (approximately 400), since the implementation of molecular techniques requires special equipment and qualified technicians.

Several solutions currently available could facilitate sampling and allow results to be available more quickly:

- RT-PCR on saliva or sputum samples, although less sensitive, offers the advantage of simplifying the sampling process [2]; according to the HAS opinion of September 18, 2020, it could be indicated in symptomatic non hospitalized patients within 7 days after the onset of symptoms, especially in cases of difficulty or refusal of nasal swabs.

- Viral antigen detection on nasopharyngeal secretions is a rapid diagnostic orientation test (RDOT) by immunochromatography, requiring no equipment and providing a result within 20 minutes. Several CE labelled tests validated by National Reference Centres are available [3]. Less sensitive than RT-PCR tests, their performance varies depending on the manufacturer, better in patients with high viral load (Ct $\leq$ 25 or > 106 copies/ml). The minimum performance requirements for HAS are a sensitivity $\geq$ 80% and a specificity $\geq$ 99% compared to RT-PCR.

- Isothermal PCR by the LAMP (Loop-Mediated Isothermal Amplification) method is an alternative with some advantages: amplification at constant temperature, without

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thermocycler and without prior extraction step. Several tests are available but less sensitive than PCR. They can be easily used for "off-the-wall" screening such as antigen RDOTs.

The current progression of the epidemic makes it desirable to implement these different tests as soon as possible, following a strategy that dissociates the indications for diagnosis and screening. The test prescription should be based on 3 indications:

1. To know if a symptomatic individual has Covid-19,

2. To know if a Covid-19 patient contact has been contaminated,

3. To find out if a non-symptomatic, non-contact individual is possibly contagious.

The National Academy of Medicine and the National Academy of Pharmacy recommend:

- to reserve RT-PCR tests only to people with a medical prescription;

- in diagnostic indications (cases 1 and 2), to perform an RT-PCR test on nasopharyngeal swab or saliva, supplemented by an antigen RDOT (guaranteeing the performance set by the HAS) if the RT-PCR result cannot be obtained within 24 hours;

- in screening indications (case 3), to perform an antigen RDOT (whose positivity indicates contagiousness but whose negativity does not exclude the carrying of SARS-CoV-2); this practice should be widely implemented in urban medicine, in EHPADs (long term care sector), health institutions, schools, high schools and universities, companies, prisons, airports, etc;

- to confirm by RT-PCR any negative RDOT result in case of regulatory requirement (air travel for example);

- to promptly include the rapid RT-Lamp tests in screening tools, including those under evaluation.

1. Press Release from the French National Academy of Medicine "Covid-19: Screen more, screen better", August 3, 2020

2. Press Release from the French National Academy of Medicine " Screening for SARS-CoV-2 carriers: what about saliva tests? "June 30, 2020

3. French Society of Microbiology. List of CE marked COVID-19 reagents available worldwide on https://www.finddx.org/covid19/pipeline/?avance=all&type=all&status=CE-IVD&section=immunoassays#diag_tab.

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