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Short Communication

How useful is serology for COVID-19?

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A paper in this journal reported on the different seroepidemiological studies carried out around the world for SARS-CoV-2 (Lai et al., 2020). This study helps to put into perspective the potential interest of serology in SARS-CoV-2 infection. The first question was, according to serological techniques, is it possible to identify positive serologies in patients sampled in 2019, before the epidemic? The answer is yes (Lagier et al., 2020). Depending on the different serological techniques used, cross-reactions may be observed, particularly in children, which could explain why SARS-CoV-2 is, to date, the only respiratory viral disease that does not affect children (Colson et al., 2020; Maltezou et al., 2020). Indeed, in most cases, children are the most affected by respiratory viral infections; this situation is reversed for SARS-CoV-2 for reasons that are not clear at this time. The second significant interest that these serological studies could have would be to confirm *a posteriori* that patients who were included in studies based on purely clinical criteria were actually infected with SARS-CoV-2. Indeed, several studies, including the Recovery study in England and that of Skipper et al. (Anon, 2020; Skipper et al., 2020), have included in their evaluation patients who had not been tested or tested negative at the time of inclusion. Performing serology retrospectively, as in one recent study for example (Derwand et al., 2020), ensures that the patients included were indeed infected with SARS-CoV-2. A recent study conducted in France shows that the predictive value of the clinical diagnosis of SARS-CoV-2 in patients who were subsequently serologically tested for SARS-CoV-2 is less than 50% (Carrat et al., 2020). This means that studies in which there was no diagnostic test to confirm the diagnosis included at least 50% of people who were not infected with SARS-CoV-2. This also depends on the sensitivity of the serological test. This makes series without diagnostic tests, hard to interpret. Seroprevalence studies help to evaluate the extension of epidemics. Incidences based on samples tested by PCR from one area to another have not provided a complete epidemiological picture of the spread and lethality of the disease. In Marseilles, we have systematically tested all symptomatic and non-symptomatic people since February 2020 (Lagier et al., 2020) and have tested 10% of the whole population. Therefore, we were able to evaluate the percentage of positive people in the initial epidemic (incidence), at 8%.

We also had samples of peoples from three other regions in France: the Ile de France (which includes Paris), the Grand Est, and the New Aquitaine regions. The incidence rates among patients tested in these regions by PCR (unpublished data) surprisingly give a result exactly superimposable to that of seroprevalence in the whole population of these areas, with 8% for the Marseille area (Etablissement Français du Sang, France, unpublished data), 10% for Ile de France, 9% for Grand Est and 3% for Aquitaine (Maltezou et al., 2020). The extent of population seroprevalence in a region or country will provide a sense of the importance of social control measures such as lockdown, the use of masks, or generalized testing. Moreover, it may clarify the lethality in our area independently of the qPCR testing capacity during the outbreak. In the research carried out in this field, particularly in Italy (ISTAT, 2020) and Spain (PollÃ¡n et al., 2020), it has been shown that persons confined in a house, when not tested for putative contagiousness, have more often been positive than working unconfined persons. This is counter-intuitive, as the consequence that SARS-CoV-2 carriers have not been detected. This raises the question of the value of the lockdown of families when asymptomatic carriers are not detected. Seroprevalence is also an excellent evaluation of the prevention measures of the health care staff. In general, the measurement of seroprevalence in Spain (PollÃ¡n et al., 2020) and Italy (ISTAT, 2020) showed a much higher prevalence of the health care personnel, indicating a weakness in prevention measures as well as their high risk. In Marseilles, the percentage of positive test results among health care staff in direct contact remained very low in May 2020, at 3.5% (Edouard et al., 2020), due to the importance of the protective measures deployed. As a matter of fact, we had to import protective artifacts directly from China, as no stock was available in France. All in all, this work opens the door to a more general reflection on the conduct of epidemiological studies to refine the consequences of social or protective measures in the spread of the virus in a given site.

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Conflict of interest

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