

**Abstract**

Compared to those seen in March-April, COVID-19 patients seen in Marseille in June-August 2020 presented less severe infections, leading to lower lethality rates. By contrast, their viral load was higher. While a resurgence of the disease was observed since June, the numbers of COVID-19-associated death rather decreased.

## Introduction

Since its emergence in China at the end of 2019, SARS-CoV-2 spread worldwide with more than 22 Million cases of COVID-19 reported, as of 21 August, 2020. Currently, most cases have been reported from the US, Brazil, India and Russia

(<https://gisanddata.maps.arcgis.com/apps/opsdashboard/index.html#/bda7594740fd40299423467b48e9ecf6>). In Europe, since the beginning of the pandemic, the EU/EEA and the UK have reported 1,733,550 COVID-19 cases and 182,639 deaths, as of 2 August, 2020 (10% of all cases reported worldwide). In early April, the EU/EEA and the UK reached a peak in reported cases. Between the second week of April and first week of June, the trend in the EU/EEA and the UK declined, after which it reached a plateau, however in recent weeks there has been a resurgence, although it is currently lower than the first peak which occurred in April 2020[1]. In France, the incidence of PCR-confirmed cases peaked on 2 April with 50.1 cases per 100,000 inhabitants and declined to less than 10 cases per 100,000 in early May, however, on 27 July the incidence rose again over this 10 case per 100,000 threshold and reached 25 cases per 100,000 on 15 August [2].

In Marseille, the largest city in south of France and the second one in France, our institute adopted a strategy consisting in early and massive screening of SARS-CoV-2 infections and COVID-19 treatment using hydroxychloroquine and azithromycin, since the first case was documented. We recently described the epidemiological, clinical and virological characteristics of 3737 adult COVID-19 patients seen at our institute between 3 March and 27 April [3]. In this paper, we describe these characteristics in 743 new adult patients seen between 15 June and 15 August with the aim to investigate possible changes in the disease between these two time periods.

## **Screening for SARS-CoV-2 infection at Marseille Méditerranée Infection Institute, February-August, 2020.**

The first SARS-CoV-2 test performed at Méditerranée Infection Institute was on 31 January, 2020 in a patients returning from Hubei region, China [4]. The daily number of tests in early February ranged from zero to three in travelers returning from China and a marked increase in the number of tests (about 50 per day) was observed starting from 24 February, 2020 due to an influx of travelers returning from Italy where the virus was circulating. The first confirmed COVID-19 case in Marseille public Hospital (Assistance Publique-Hôpitaux de Marseille (AP-HM)) was diagnosed on 3 March, in a French female in her fifteen returning from a ski station in French Alps. Starting from early March, our institute proposed massive testing of any person presenting at our facility regardless they had or not COVID-19 symptoms. On 16 March 1, the WHO Director-General called for testing every suspected COVID-19 case [5]. In France, the generalization of SARS-CoV-2 PCR testing was officially authorized by the Ministry of Health on 4 May [6]. The number of individuals newly-tested at AP-HM for SARS-CoV-2 infection by PCR [1] sharply increased from 765 per week in late February (week 9) up to 8105 per week at the peak at the end of March (week 13), and then progressively decreased to 1481 patients per week in early June (week 24) (**Figure 1**). It then increased again to reach 5007 per week on mid August (week 33). Interestingly, the proportion of individuals testing positive paralleled this curve with a slight shift of one week. Indeed, it was 1.4% during week 10, culminated at 18.4% during week 14, and then decreased to less than 2% between weeks 19 and 24. It then increased to reach 8.7% on week 33. By contrast, numbers of deaths peaked to 33 per week during week 14 and progressively decreased to reach 0 week 24. No further increase was observed so far.

## **Epidemiological, clinical and virological changes for COVID-19 patients according to seasons**

Data were obtained retrospectively from patient files. All statistical analyses were carried out using R [R Core Team. R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria, 2020. URL: <https://www.R-project.org/>]. Fisher exact test was used to compare differences between proportions (unilateral test used when indicated). Quantitative data means were compared using Student's t-test or Wilcoxon's rank test. The multifactorial analysis was done using Factor Analysis for Mixed Data (FAMD) [7]. A p-value < 0.05 was considered as statistically significant.

Compared to patients seen during late winter and spring, those seen in summer were significantly younger with a lower proportion of patients aged  $\geq 65$  years, and were more likely to be male, although differences were not marked (**Table 1**). No significant differences were seen with regards to anosmia and ageusia prevalence, according to period of study. Hospitalization rate, proportion of patients transferred to ICU, and lethality rates were significantly lower in patients seen in summer than in those seen in late winter and spring. The mean Ct value of positive PCR results was significantly lower in patients seen in summer than in those seen in late winter and spring, with a proportion of patients with high viral load ( $Ct \leq 16$ ) tending to be lower in summer. Lymphocyte and platelet counts and fibrinogen and D-dimer levels were significantly lower in patients seen in summer as compared to those seen in spring.

## **Conclusions**

The current resurgence of COVID-19 in Marseille that started in June shows a marked dissociation between numbers of cases and numbers of death. The number of deaths among COVID-19 patients seen at our institute did not show a significant rebound, so far, while the number of cases clearly re-increased. Since the kinetic of the proportion of individuals testing

positive paralleled the total number of tested individuals, the current increase in the number of new patients is not an artifact due to an increase in the number of tested individuals.

In this report we also show that the presentation of the disease in patients seen in summer is different than that of patients seen earlier. Patients in the two periods do not present marked age and sex differences, but markers of severity are undoubtedly less prevalent in the current period, associating with a 10 times decrease in the lethality rate from 1.1 to 0.1%. At the time of writing, it seems, as described in other diseases [8], that the start of the epidemic was characterized by higher lethality rates, in comparison with the current phase of the epidemic. The current situation of the COVID-19 epidemic seems to be similar to that of other endemic coronavirus infections[9, 10]. Continuous analysis of epidemiological data is needed in the following months to confirm that this trend is continuous.

### **Competing interest**

The authors declare that they have no competing interests.

## References

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**Legend to figures**

**Figure 1. Number of persons tested for SARS-CoV-2, proportion testing positive and number of death in COVID-19 patients per week, at Méditerranée Infection Institute.**