



## Case Report

## What if the worst consequences of COVID-19 concerned non-COVID patients?

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## ABSTRACT

We highlight in this short article the side-effects of COVID-19 pandemic on the management of non-COVID patients, with potential detrimental and irreversible complications. We thus propose adjusted strategies to deal with both COVID and non-COVID patients.

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All health systems worldwide are currently facing a unique and fearsome sanitary situation and, consequently, are entirely distracted by the management of potential COVID-19 patients. In France, the first case of COVID-19 was confirmed on the 24th of January, with an increasing number of cases reaching over than 190,000 cases, 8000 patients requiring intensive care and more than 29,000 deaths related to the disease or its complication [1].

As described in the large majority of countries affected by the COVID-19 epidemic, the French health system was quickly and severely strained in cluster regions, before a nationwide dissemination. Use of a mobile intensive care unit (MICU) with a unique national emergency number (#15) and on-board emergency physicians, delivering prehospital therapies and providing rapid diagnosis, evaluation of severity, direct transfer to appropriate centers and use of mobile extracorporeal life support facilities for the sickest patients, is unique to the French health care system.

However, the existing possibilities for patients to warn the health system were quickly overwhelmed, both for emergencies and subacute diseases. Hence, the access to the national emergency number rapidly became unavailable because of the high number of calls. As a consequence, the ability of the emergency departments to receive, evaluate and address COVID and non-COVID patients and

maintain isolation procedures has been challenged. In the first cluster regions affected by the disease, the capacity to admit patients with severe respiratory syndrome was undermined because of the lack of beds in intensive care units (ICU). These findings and those from our European neighbors, especially from Italy, led the French government to enforce strict containment measures as of March the 17th with the aim of influencing the epidemiological curve of the disease by drastically decreasing the reproduction risk (so-called “R0”).

The influx of COVID-19 patients was slightly delayed in comparison to neighboring countries. This precious time enabled us to set up a wide range of measures and procedures: (i) a huge increase of available phone lines dedicated to emergency calls through our national emergency number; (ii) training and education of caregivers and doctors, and the dispatching of staff to emergency departments or COVID-19 dedicated wards; (iii) a dramatic increase in ICU bed availabilities, including the transformation of recovery rooms into ICU units; (iv) the cancellation or postponement of all non-urgent activities (surgeries, radiology acts, consultations); (v) the separation of medical beds into “COVID” and “non-COVID” beds in order to split both activities while in parallel globally increasing the number of these medical beds.

The emergency department appears as the cornerstone for the application of these improved procedures. The assigned nurses and physicians conduct pre-examination and triage to divide visits into high-suspected and low-suspected Covid-19 patients using dedicated questionnaires. Patients are then conducted through specified pathways into high-risk and low-risk

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areas. After complete evaluation (clinical examination, SARS-CoV-2 polymerase-chain reaction testing in nasopharyngeal sample, and thoracic CT-scan), patients are either hospitalized in dedicated wards or ICU, or may go back home (with instructions and scheduled phone visits).

Nevertheless, this crisis and the subsequent reorganization of both hospital and town medicine would be associated with substantial side-effects that we would like to highlight.

Due to the overload of the emergency lines, some patients were obliged to come to the hospital by their own transport even with severe conditions, such as myocardial infarction or stroke. As a consequence, they were exposed to delayed management, and a higher risk of complications and subsequent mortality. Even after reaching the emergency department, the diagnostic procedures and the access to technical facilities may have been delayed because of the dedicated measures to COVID's patient management.

Previous even to the difficulty of warning doctors or accessing hospitals, many patients deliberately downplayed their symptoms because they were afraid to go to the hospital. This apprehension also concerned general practitioners who may have delayed addressing patients to hospital, especially elderly ones. From 1 st March to 30th April, 15,369 deaths due to COVID-19 were reported in France [2]. An over-mortality was observed in comparison to the same periods in the two prior years with 133 678, 109 265 and 117 018 deaths in 2020, 2019 and 2018 respectively which means an increase of overall death rate of 22 % and 14% in comparison to 2019 and 2018 (data from the French national statistical institute). The proportion of COVID-19 related deaths is probably underestimated, attending that other causes of death (traumatic deaths for example) were significantly less frequent in 2020 than 2019 or 2018. Moreover, suspected impact of the COVID-19 on the mortality of other diseases cannot be confirmed given that difficult data collection and potential entanglement of different causes. However, based on electronic medical and administrative data systems of 22 hospitals of the eastern part of France (a region that has been struck early and with a high intensity of the COVID wave), decrease of 26% of all emergency department visits was observed, including a decrease of 34% of strokes, 32% of transitory ischemic attacks, 64% of unstable angina, 42% of appendicitis and 36% of seizures. We assume that patients may have been reluctant to call emergencies and come to hospital in this pandemic context and rather postponed healthcare even though their life could be at stake. This phenomenon has already been described for strokes [3,4]. Emergency physicians should definitely be worried about this collateral damage that the COVID-19 outbreak is generating [5]. Such behavior could be very detrimental for patients with nonspecific initial symptoms associated with autoimmune diseases, for patients with undiagnosed or untreated cancers [6], or for those with mental diseases [7], and could potentially lead to irreversible complications.

In a second time, COVID-19 outbreak is also having a huge impact on long-term diseases, especially people experiencing disability. Outpatient activities stopped for 87%, involving 318,000 patients per day in Italy, Belgium and UK, leading to an estimate range of 1.3–2.2 million in Europe [8]. This may lead to future cumulative effects due to reduced functional outcomes and consequent increased burden of care.

Apart from the unavailability of health care resources for COVID and non-COVID patients, this pandemic has also led to a media uproar, potentially detrimental to people's health [9]. Since the beginning of the disease in France, every doctor – and every media outlet – has speculated about predictive factors associated with the appearance of respiratory distress. The use of anti-inflammatory drugs was initially suspected (and still debated). As a consequence, many patients decided of their own accord to stop their long-

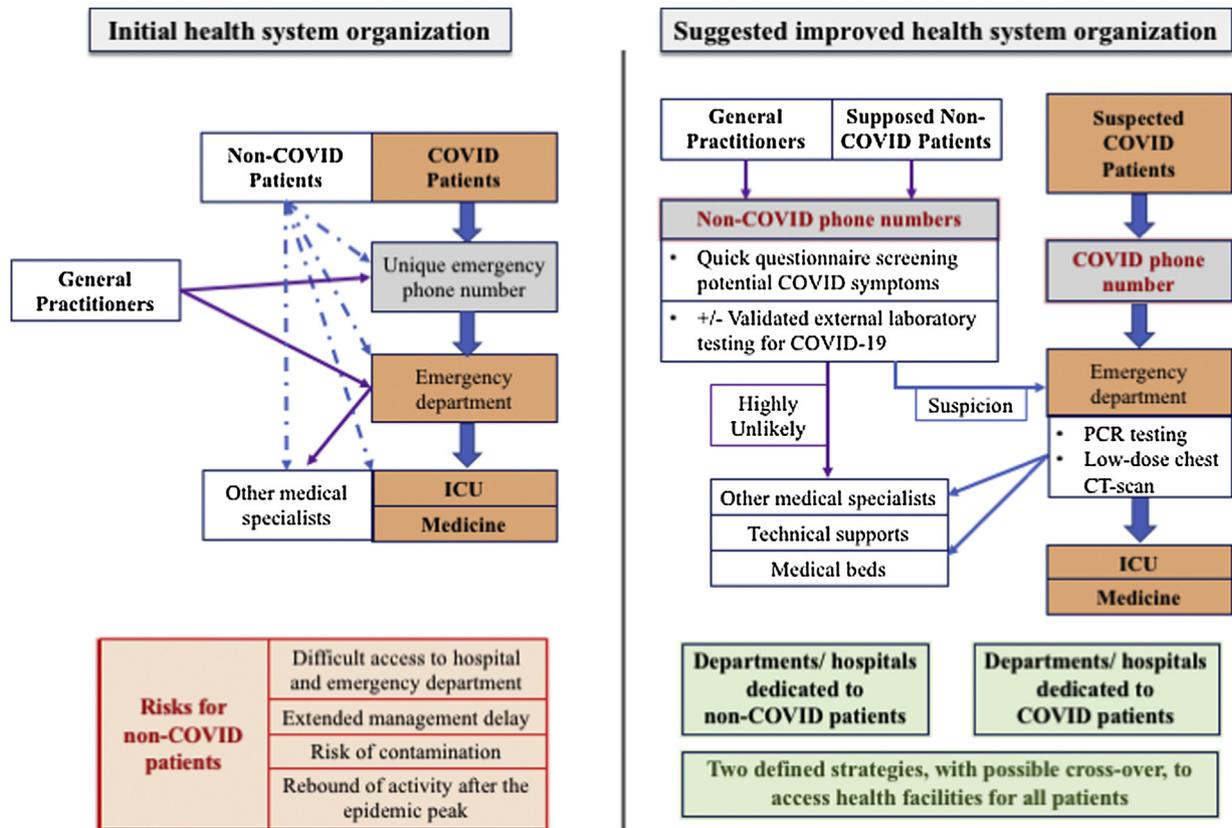
term steroid treatment for their autoimmune diseases for instance. Even more seriously, some patients with heart diseases stopped taking their anti-platelet therapy as they considered aspirin to be part of these anti-inflammatory drugs. Unfortunately, the exact proportion of patients experiencing this brutal treatment disruption is not easily reportable. Consequences of such disruption may appear in the following weeks. Finally, the great controversy around the potential benefits of hydroxychloroquine led to the reduction of pharmacies' entire stock of hydroxychloroquine [10]. This had two main consequences: (i) reported cases of chloroquine intoxication or adverse effects [11]; (ii) difficulties for patients with systemic lupus erythematosus to obtain their usual treatment, risking a relapse of their disease, especially in low-income countries [12].

For all these reasons and despite the required reorganization of the health care system, we believe that adjustments to our management of such a crisis should be considered and could be extrapolated to other countries. Firstly, the emergency call number could be split into two lines: the first one dedicated to the "COVID-19" infection with trained people able to explain containment measures as well as disease surveillance at home, and the level of symptom severity at which an examination at hospital is required; and the second one dedicated to "non-COVID" patients. This second line could manage calls reporting heart problems, strokes, accidents, cancers, and other infectious or dysimmune diseases involving immunocompromised patients, and lead quickly and directly to consultations or tests with the appropriate specialists, completely bypassing the emergency department. This line, with a dedicated access to general practitioners, could reduce the delay in diagnosing and treating "non-COVID" patients. Some adjustments have already been proposed concerning heart diseases [13]. These procedures should also involve the management of chronic diseases and disabilities, in order not to let severe complications happen within this population, altogether with preventing them from being contaminated by the COVID-19. In this period when all potential inpatients can be carriers of the disease, all medical and paramedical teams are aware of potential risk of respiratory failure associated to COVID-19 infection. It is thus most unlikely that a patient, initially considered as "highly non suspicious of COVID", would suffer a delay in the management of a COVID-19 respiratory failure happening in a second time.

This strategy should be supported by a large information campaign, supported by the media and validated by scientists and the government [9]. This could avoid the potential lost-of-chance for patients with undiagnosed diseases, and also probably reduces the secondary risk of limited access to scheduled medical activity, in relation with the expected rebound after the epidemic.

Moreover, in case of very large number of cases, a further degree of the health care system's reorganization should be the designation of "COVID" and "non-COVID" health centers in each town to reduce the risk of contamination, improve the patients' pathways, and to consolidate health facilities and experienced caregivers on the one hand while enabling continued management of non-COVID patients without increasing risk on the other hand (Fig. 1).

This dreadful crisis severely challenges our health care system. In the past 10 years, H1N1 flu, SARS, and MERS epidemics have threatened global population but the contagiousness and mortality rates were never as high as those of COVID-19. The current crisis should make us think about how to manage an ongoing epidemic while maintaining a sufficient level of healthcare for other patients. This could also be helpful in the case of a prolonged epidemic or recurrences. One of the answers could be to propose procedures that would facilitate more direct access to hospitals for subacute



**Fig. 1.** The figure represents the organization of the initial French health system at the beginning of the epidemic (left panel), and the suggested improved reorganization of the health system (right panel). The solid arrows represent the established relations between the different medical facilities and physicians; the dotted ones represent the restricted access for non-COVID patients to such facilities. COVID means coronavirus disease and ICU, intensive care unit.

diseases, without overloading the emergency department and the overall health care system.

**Conflicts of interest**

The authors declare there is no conflict of interest regarding this article and this topic.

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