1   TITLE PAGE

2   **Hydroxychloroquine recommendations toward the world : first evaluations**

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LETTER

16 SARS-COV2 is an infection caused by a new virus for which no antiviral treatment was known when it

17 first emerged. Since the publication of the first results, from China, on the use of chloroquine and its

18 derivatives in vitro (1) and in vivo (2), then the publication of the trial led in Marseille on the

19 combined use of hydroxychloroquine and azithromycin (3), many countries have adopted this

20 treatment to treat patients with SARS-COV2. Over 60% of humans worldwide live in a country where

21 chloroquine and its derivatives are recommended to treat patients with SARS-COV2. Other countries,

22 waiting for the results of clinical trials to define their strategy, or worried about potential side effects

23 that have not been demonstrated, have favored other treatments or the standard of care. This has

24 not stopped practitioners in these countries from turning massively to hydroxychloroquine as a

25 treatment for SARS-COV2, as shown by the results of surveys by the specialized institute SERMO (4).

26 Today, now that the epidemic is in a phase of decline in most of the hardest hit countries (5), we can

27 issue initial assessments of the treatment strategies adopted in the world according to the mortality

28 of each of the country. We therefore determined which countries recommended hydroxychloroquine

29 using the recommendations issued by the authorities of these countries as source, identifying among

30 them those who had a late use (after the peak of the epidemic) of this treatment (Figure 1a).

31 Following this work, we established a second map which identifies the 15 countries most affected by

32 the epidemic (in number of deaths per million inhabitants), then the top 16-30 of the countries most

33 affected by the epidemic (Figure 1b).

34 A comparison of these two maps shows that developing countries have massively turned to the use

35 of hydroxychloroquine, as well as Asian countries which present low mortality by SARS-COV2, despite

36 the fact that they have been the first to be affected by the epidemic. These countries have in

37 common the early adoption of treatments based on hydroxychloroquine and chloroquine, whether

38 or not combined with other antivirals. The countries having expressed the concerns for its use are

39 mainly rich countries (France, Germany, United States). It should be noted that Chinese studies show

40   that China has adopted aggressive strategies against the virus in its treatment protocols, often

41   combining up to three antivirals (6). This therefore shows a discrepancy between the strategies of

42   the Western world and those of developing countries and the Far East, some being much more

43   cautious than others with regard to the use of treatments to fight against the epidemic. The opposite

44   distribution of chloroquine recommendation and fatality rate is striking. However, there is a

45   correlation but given the multiple factors affecting the epidemics and the fatality rate, no direct

46   caused effect could be claimed.

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48   **References**

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77   **Figures**

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79   Figure 1a : countries recommending the use of hydroxychloroquine to treat patients infected with

80   SARS-COV2. (red : early recommendation ; orange : late recommendation)
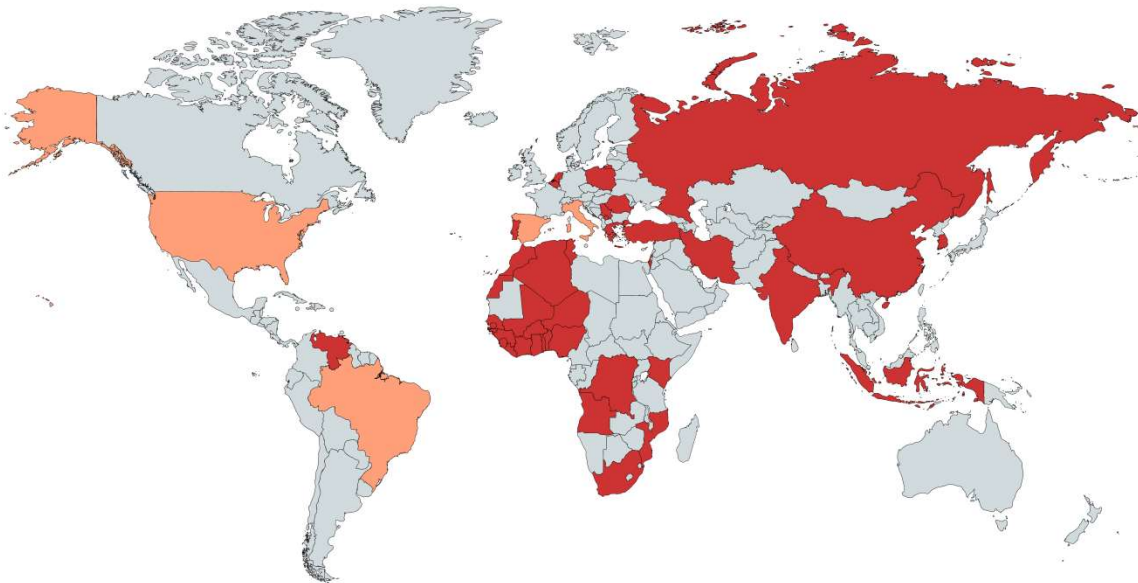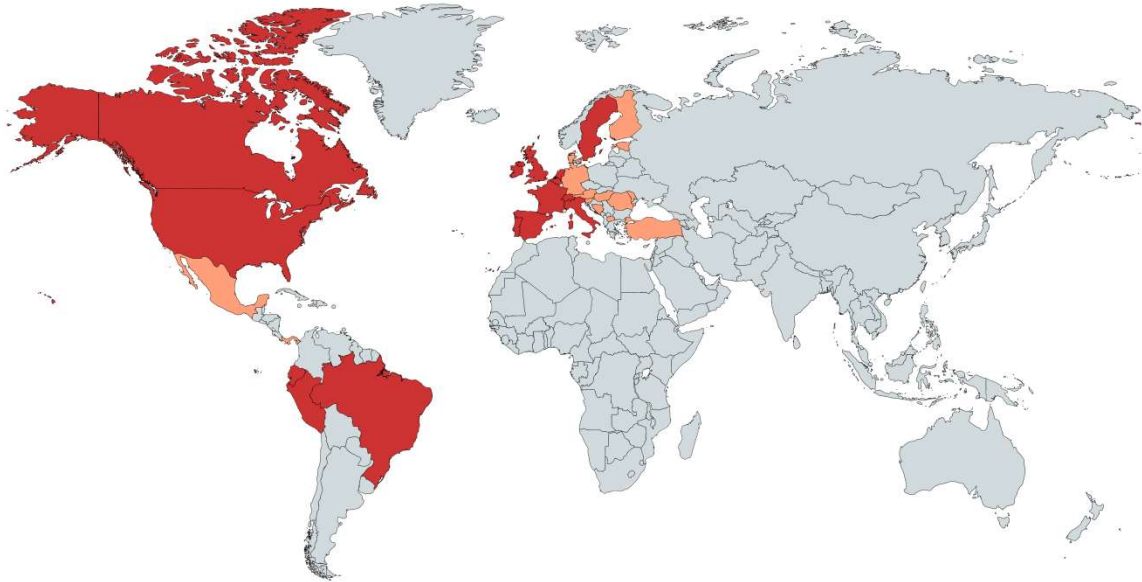

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86   Figure 1b : T op 15 of countries with the highest mortality per million inhabitants (red), Top 16-30 of

87   the countries with the highest mortality per million inhabitants (orange), source Johns Hopkins

88   University on June 3, 2020.

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