

1 **Title:** Evaluation of strategies to fight COVID-19: The French paradigm

2

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22

23 **Key words:** COVID-19; SARS-CoV-2; France; deaths; Marseille; Paris

24

25

26 **Abstract**

27 **Background:**

28 The management of COVID-19 has been highly discrepant across the world. In France, no
29 mass screening has been performed, containment has been implemented, and no therapy has
30 been officially approved. Our institute chose to screen anyone who came forward, and a
31 combination therapy of hydroxychloroquine and azithromycin was offered to positive patients.
32 To evaluate our data in a global context, we collected mortality data and the age distribution
33 of the deceased in France and other European countries, as well as specifically in the cities of
34 Paris and Marseille, and compared them.

35 **Materials and methods:**

36 Data on mortality related to COVID-19 and the associated age distribution were collected
37 from government institutions in various European countries. In France, data were obtained
38 from INSEE and Santé Publique France. All-cause mortality was also examined in order to
39 study potential excess mortality using EuroMOMO. The Marseille data came from the
40 epidemiological surveillance system set up by our institution covering 4 university hospitals
41 in Marseille.

42 **Findings:**

43 France is one of the European countries most impacted by COVID-19, behind Belgium, Spain,
44 the United Kingdom and Italy. Its proportion of deaths in people under 60 years of age is
45 higher (6.5%) than that of Italy (4.6%) or Spain (4.7%). Excess mortality was also observed,
46 with approximately 5% more deaths than during the corresponding dates in 2018 and 2019.
47 Ile-de-France and the Grand Est are the two French regions with the highest mortality (647
48 and 592 deaths per million inhabitants vs. 181 in the Southern region, where our institute is
49 located). However, the proportion of deaths in the under-60 age group was considerable in
50 Ile-de-France (9.9% vs. 4.5% in the Southern region). By estimating mortality based on

51 seroprevalence, we observed an excess of deaths in Ile-de-France and the Grand Est, while the
52 expected mortality in the Bouches-du-Rhône (a department of the Southern region) was lower
53 than expected. Significantly higher numbers of patients hospitalized, in intensive care and
54 deceased in Paris than in Marseille.

55 **Discussion:**

56 France's strategy of privileging randomized clinical trials of severe patients to the detriment of
57 patient management, i.e., from screening to diagnosis, including biological assessment and
58 clinical examination, probably explains the high mortality associated with COVID-19.

59

60 **Introduction**

61 In December 2019, a novel coronavirus known as SARS-CoV-2 (severe acute respiratory
62 syndrome coronavirus 2) emerged and spread from Hubei Province, China, to the rest of the
63 world in a few months. The disease (COVID-19) did not spare any continent and was
64 declared a pandemic by the WHO on 11 March 2020. As of October 5, 2020, 35,220,166
65 cases of COVID-19 and 1,037,604 deaths related to this disease had been reported worldwide
66 [1]. The epidemic seemed to be diminishing or even stopping in Western European countries
67 in June, as has been observed in Asia, but an upsurge in the number of cases was observed in
68 early July where borders were reopened.

69 The management of COVID-19 has been subject to considerable divergences around
70 the world. These divergences have concerned containment measures, the systematization of
71 virus detection tests, isolation and therapeutic strategies. The same is true within France.
72 Indeed, to limit the spread of the virus, the French government initially decided to close
73 schools and universities [2] as well as all cultural facilities, such as theatres and museums,
74 and cancelled large gatherings of people [3]. A total lockdown was finally decreed on 17
75 March 2020 with the objective of stopping the chain of transmission [4]. However, unlike in
76 Iceland or South Korea, no mass screening was then carried out systematically on a national
77 scale in the early stage of this pandemic, which would have made it possible to quickly obtain
78 information on the incidence of the disease and thus put in place public health measures better
79 adapted to the particularities of the spread of the virus in our territory [4-6]. Only "individuals
80 with clinical signs of acute respiratory infection with documented or subjective fever who
81 have travelled to or stayed in a high-risk exposure area within 14 days prior to the date of
82 onset of clinical signs, or individuals who have had close contacts with a confirmed COVID-
83 19 case or any person showing signs of pneumonia or acute respiratory distress" were
84 screened in March 2020 [7]. These positive patients were quarantined for 14 days. Finally,

85 mass screening was proposed on May 11, 2020, when lockdown was lifted and borders
86 reopened.

87 In Marseille, organized mass screening was carried out beginning January 27, 2020,
88 comparable to what was implemented in Iceland, and hydroxychloroquine/azithromycin
89 combined therapy (HCQ+AZ) was proposed in our institute for most COVID-19 patients [8].
90 In Paris and the Ile-de-France region, early treatment was not proposed, nor was any therapy
91 that was not officially approved until the end of May and the lockdown [9].

92 We were interested in comparing the epidemic level and lethality under such different
93 conditions to evaluate strategies involving only social measures versus both social and
94 medical measures. We collected available data on testing strategies, therapeutic options and
95 lockdowns in different countries and in the cities of Paris and Marseille, and we compared the
96 mortality. We paid special attention to the percentage mortality by age, which appeared to us
97 to be an important marker. Indeed, mortality in people over 80 years of age is usually high in
98 the winter and summer periods in temperate countries due to the circulation of common
99 respiratory viruses. It is possible that mortality in people under 60 years of age can serve as a
100 marker of the effectiveness of therapeutic management in a given situation.

101 **Materials and methods**

102 *COVID-related mortality in France and other European countries*

103 The mortality associated with COVID-19 in France and different European countries was
104 collected from the Center for Systems Science and Engineering (CSSE) at Johns Hopkins
105 University [1] as of June 2, 2020. To correct the biases linked to the size of the countries, we
106 calculated the mortality rate per million inhabitants. The case fatality rate (CFR, the ratio of
107 the number of deaths to the number of confirmed cases, i.e., the lethality rate) was obtained
108 from the aggregator site Our World in Data as of June 2, 2020. The age distribution of
109 individuals who died from COVID-19, when available, was collected for several countries.
110 Data for the United Kingdom were collected from the National Health Service (NHS)
111 (<https://www.england.nhs.uk/statistics/statistical-work-areas/covid-19-daily-deaths/>) as of
112 June 2; those for Italy were collected via Epicentro, Istituto Superiore di Sanità
113 (<https://www.epicentro.iss.it/>) as of 1 June; those for Spain were collected via El Centro de
114 Epidemiologia (CNE) (<https://cnecovid.isciii.es/>) as of May 29; and those for Germany were
115 collected via INED (<https://dc-covid.site.ined.fr/en/data/germany/>) by June 2. The proportion
116 of deaths among people under 60 years of age was calculated. The mortality aboard 3 ships,
117 namely, the Diamond Princess, the Roosevelt and the Charles de Gaulle, has also been
118 documented in the literature [10-12].

119

120 *Excess all-cause mortality in France and other European countries*

121 All-cause mortality in France and at the regional level according to the decedents' place of
122 residence between January 1 and August 31 for 3 years (2018, 2019 and 2020) was collected
123 from the INSEE database [13] to assess potential excess mortality. Excess mortality in Paris
124 and Marseille was also studied using the same database.

125 The excess mortality by country and by age group (0-14, 15-44 and 45-65 years) was
126 retrieved from the EuroMOMO website (<https://www.euromomo.eu/graphs-and-maps>), which
127 collects all-cause mortality data from several European partner countries such as France, the
128 United Kingdom, Italy and Spain. The excess mortality was estimated using the z-score,
129 which allows comparisons of mortality between the different countries and the different time
130 periods studied [14].

131

132 *French departmental and regional data on COVID-19*

133 Daily hospital data related to COVID-19 by French region and department were obtained
134 from Santé Publique France, a public health institute in France [15]. These data were
135 available only from March 19 onward, and our study period was therefore limited to March
136 19 to June 2, 2020. To correct for biases related to population size in each region and
137 department, we calculated the mortality rate in France per million inhabitants. The size of
138 each regional population was retrieved from the Institut National d'Études Démographiques
139 (INED) database [16]. The population of each department was collected from the INSEE
140 database.

141 Deaths associated with COVID-19 by age group according to region were retrieved from
142 GEODES, the French Public Health mapping observatory, over the same study period [17].

143

144 *Seroprevalences in French regions and probability of mortality*

145 Adjusted estimates of seroprevalences in Ile-de-France, in the Grand Est, and in New
146 Aquitaine were collected in an article preprinted on MedRxiv in September 2020 [18]. The
147 seroprevalence in the Bouches-du-Rhône is based on data from the Blood Establishment and
148 is still unpublished. The overall probability of death among the infected cases was collected in
149 the study of Salje et al., 2020, and equals 0.5% [19].

150

151 *Marseille data*

152 Local data for the city of Marseille were obtained by using the epidemiological surveillance
153 system from our institute that collects information on patients hospitalized at Assistance
154 Publique – Hôpitaux de Marseille (AP-HM), which comprises four public university hospitals
155 [20,21]. This system is based on the results from the clinical microbiology laboratory of the
156 IHU Méditerranée Infection, and includes microbiological results (sample type, sample date,
157 requesting unit) and anonymous patient information (age, sex, home postal code, date of
158 admission), stored in a data warehouse using MariaDB. COVID-19-associated mortality data
159 were obtained from the Department of Medical Information (DMI) of AP-HM.

160 The size of the Marseille population was also obtained from the INSEE database [22].

161 These data were collected from January 27 to May 31, 2020.

162

163 *Statistical analysis*

164 The statistical analyses were performed with OpenEpi software
165 ([https://www.openepi.com/TwoByTwo/TwoByTwo.htm?fbclid=IwAR0NjbfG7d77LiFSY](https://www.openepi.com/TwoByTwo/TwoByTwo.htm?fbclid=IwAR0NjbfG7d77LiFSYTzdJAbK3YIPaYi2ZDFEeCnhFqbHFuMfibs1jaWI)
166 [TzdJAbK3YIPaYi2ZDFEeCnhFqbHFuMfibs1jaWI](https://www.openepi.com/TwoByTwo/TwoByTwo.htm?fbclid=IwAR0NjbfG7d77LiFSYTzdJAbK3YIPaYi2ZDFEeCnhFqbHFuMfibs1jaWI)). A chi-square test or mid-P test was used
167 to compare groups, depending on the variables. The graphs were created using the software R
168 [23] with the ggplot2 package [24] and using Excel.

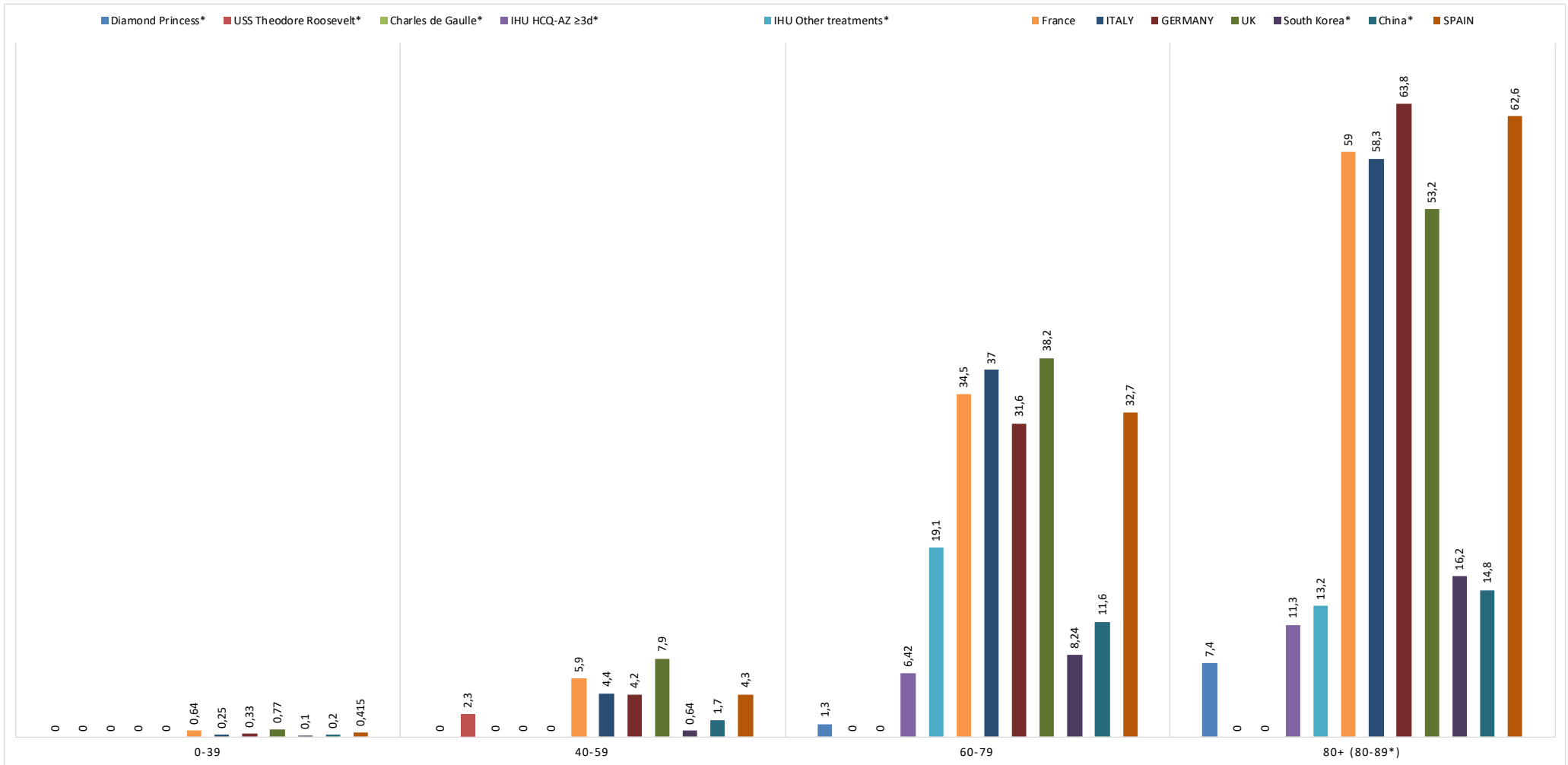
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170 **Results**

171 *Overall analysis and positioning of France in relation to other European countries*

172 France, with 28,836 deaths, is one of the countries most impacted by COVID-19 in Europe.
173 Its mortality rate is 441.8 deaths per million inhabitants, placing it behind Belgium (825.4),
174 Spain (580.2), the United Kingdom (576.6) and Italy (553.6). However, its case fatality rate

175 (CFR) was 20%, the highest in Europe. France is also one of the countries where the
176 proportion of individuals under 60 years of age was especially high (6.5%, N = 1.201),
177 exceeding the rates in Italy (4.6%, N = 1.487), Spain (4.7%, N = 969) and Germany (4.5%, N
178 = 378) (Figure 1). The United Kingdom reached 8.6% (N = 2.336). There were no deaths on
179 the French warship Charles de Gaulle. One death (2.3%) of a 41-year-old man was recorded
180 on the USS Theodore Roosevelt. On the Diamond Princess, a cruise ship, the majority of
181 those who died were over 80 years of age (7.4%). Overall, Belgium, France, Italy, the
182 Netherlands, Spain, Sweden and the United Kingdom had excess mortality at least 10
183 standard deviations above the mean. For the 45-65 age group, this excess mortality was
184 highest for England (z-score of 25.9), followed by Spain (16.5) and France (8.8).



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Figure 1 – Mortality rate by age group on 3 ships (the Diamond Princess, the USS Theodore Roosevelt and the Charles de Gaulle) and in France, Italy, Germany, the United Kingdom (UK), South Korea, China, Spain and our institute following treatment.

189

190 *Comparison of excess all-cause mortality*

191 In France overall, 430,254 deaths due to all causes were observed between January 1st, 2020,
192 and August 31, 2020. This corresponds to an increase in the number of deaths by 4.6% and
193 5.0% compared to 2018 and 2019, respectively, for the corresponding periods of time (Table
194 1). The excess mortality was high in dependent elderly residents in retirement homes and at
195 home but was not noted among hospitalized patients. Ile-de-France had the highest excess all-
196 cause mortality (+22%) nationwide, while a decrease was observed in New Aquitaine (Table
197 1). In Ile-de-France, the highest excess mortality was observed in residential facilities for
198 elderly dependents and in hospices (+48% compared to 2018 and +55.3% compared to 2019).
199 Excess mortality at home was approximately 28% in Ile-de-France, 14% in Grand Est, 6% in
200 Sud and 2% in New Aquitaine. However, hospital mortality has decreased in Sud
201 (approximately -6%) and New Aquitaine (approximately -4%), while it has increased in Ile-
202 de-France and Grand-Est by 15% and 6%, respectively. Regardless of the location of death,
203 April had the highest excess mortality, with an increase of 32.7% over 2018 and 36.1% over
204 2019. A lower excess mortality of 17% (compared to 2019) was visible as early as March,
205 particularly for Grand-Est. There was no significant increase or decrease in the other months
206 studied (Supplementary data S1, S2, S3, S4).

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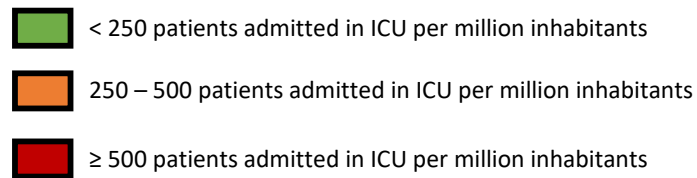
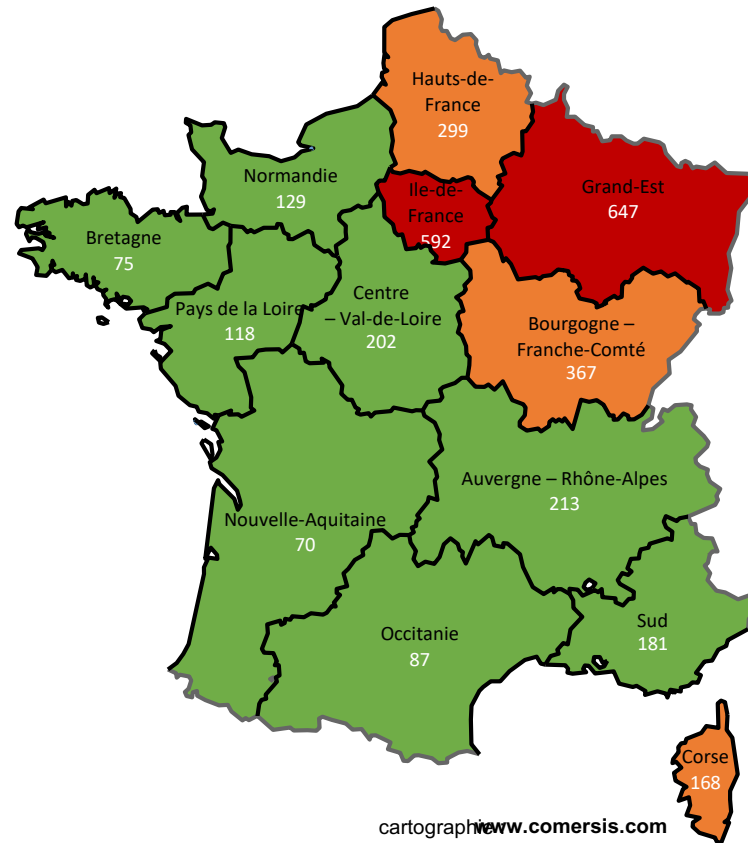
8 Table 1 – Excess mortality in 2020 compared to 2018/2019 from January to August in France, including 4 regions. The data were collected from the INSEE
9 database.

	2020 vs 2018									
	Sud		Ile-de-France		Grand-Est		New-Aquitaine		France	
	N	Number of excess deaths (% excess)	N	Number of excess deaths (% excess)	N	Number of excess deaths (% excess)	N	Number of excess deaths (% excess)	N	Number of excess deaths (% excess)
Deaths from all causes	34,176	321 (0.9%)	50,386	10,966 (21.8%)	36,194	4,150 (11.5%)	44,017	-1,175 (-2.7%)	411,271	18,983 (4.6%)
Deaths from all causes in public or private hospitals	17,695	-1,039 (-5.9%)	30,790	4,622 (15.0%)	21,099	1,017 (4.8%)	22,485	-1,063 (-4.7%)	219,669	- 1,104 (-0.5%)
Deaths from all causes in hospice or among dependent elderly residents in retirement homes	3,981	190 (4.8%)	5,196	2,493 (48.0%)	5,078	1,463 (28.8%)	6,859	-3 (0.0%)	51,634	5,908 (11.4%)
Deaths from all causes at home	9,721	597 (6.1%)	10,674	3,119 (29.2%)	7,979	1,083 (13.6%)	10,931	100 (0.9%)	98,624	7,060 (7.2%)

	2020 vs 2019									
	Sud		Ile-de-France		Grand-Est		New-Aquitaine		France	
	N	Number of excess deaths (% excess)	N	Number of excess deaths (% excess)	N	Number of excess deaths (% excess)	N	Number of excess deaths (% excess)	N	Number of excess deaths (% excess)
Deaths from all causes	34,267	230 (0.7%)	50,556	10,796 (21.4%)	35,654	4,690 (13.2%)	43,791	-949 (-2.2%)	409,835	20,419 (5.0%)
Deaths from all causes in public or private hospital	17,784	-1,128 (-6.3%)	31,045	4,367 (14.1%)	20,534	1,582 (7.7%)	22,266	-844 (-3.8%)	217,409	1,156 (0.5%)
Deaths from all causes in hospice or among dependent elderly residents in retirement homes	4,135	36 (0.9%)	4,952	2,737 (55.3%)	4,862	1,679 (34.5%)	6,473	383 (5.9%)	49,578	7,964 (16.1%)
Deaths from all causes at home	9,659	659 (6.8%)	10,843	2,950 (27.2%)	7,976	1,086 (13.6%)	10,686	345 (3.2%)	96,429	9,255 (9.6%)

210 *Mortality rates associated with COVID-19 in France*

211 Three groups seemed to emerge according to mortality rates. Grand-Est and Ile-de-France
212 were the two regions most impacted by COVID-19, with 647 and 592 deaths per million
213 inhabitants, respectively (Figure 2). However, this rate was significantly higher in Grand-Est
214 than in Ile-de-France (p-value <0.001). Haut-Rhin, a department in the Grand-Est region, had
215 the highest mortality rate, with 1,095 deaths per million inhabitants. Within the Ile-de-France
216 region, Paris was the most impacted department, with 798.9 COVID-19-related deaths per
217 million inhabitants. Bourgogne-Franche-Comté and Hauts-de-France (regions bordering the
218 two previous regions) had lower incidence rates, as did the island of Corsica, with 367, 299
219 and 168 deaths per million inhabitants, respectively (p-value <0.001). The other regions,
220 including the Sud region (formerly known as the Provence-Alpes-Côte d'Azur region) (181
221 deaths per million inhabitants) and New-Aquitaine (70 deaths per million inhabitants), had
222 mortality rates almost 3 times lower than that of the Grand-Est region. The Bouches-du-
223 Rhône, a department in the Sud region where our institute is located, had a mortality rate of
224 263 deaths per million inhabitants.



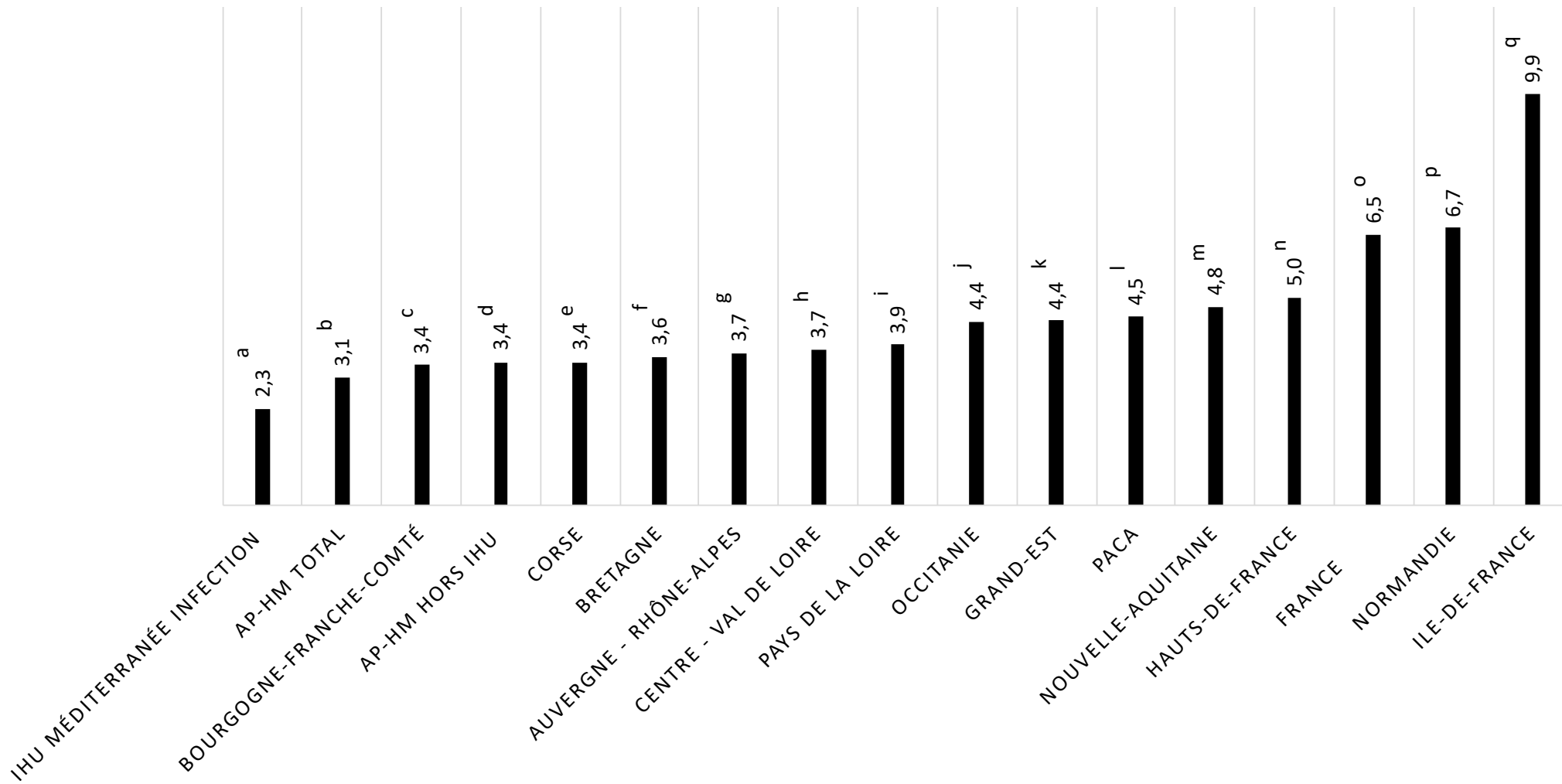
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7 Figure 2 – Regional distribution of COVID-19 mortality per million inhabitants. Green indicates regions that were less impacted by COVID-19, orange
8 indicates regions that were moderately impacted by COVID-19 and red indicates regions that were strongly impacted by COVID-19.

229 *Mortality associated with COVID-19 in people under 60 years of age*

230 COVID-19 killed mainly patients over 80 years of age. The 80-89 age group appeared to be
231 the most impacted age group nationally, regionally and locally (Supplementary Table S5).

232 Mortality rates in patients under 60 years of age varied according to region (Figure 3). This
233 percentage reached 9.9% (N = 701) in the Ile-De-France region, which was significantly
234 higher than that observed in the Sud region (4.5%, p-value = 0.0000003), in the Grand-Est
235 region (4.4%, p-value = <0.0000001), in the Auvergne-Rhône-Alpes region (3.7%, p-value =
236 <0.0000001) and in France overall (6.5%, p-value = <0.0000001). No significant difference
237 was observed regarding mortality in patients under 60 years among the Sud region (4.5%), the
238 Auvergne-Rhône-Alpes region (3.7%) and the Grand-Est region (4.4%) (Supplementary
239 Table S6).



q vs k, p-value <0.001, q vs i, p-value <0.001, q vs g, p-value <0.001, q vs b, p-value = 0.007, q vs o, p-value <0.001

Figure 3 – Comparison of mortality associated with COVID-19 in patients under 60 years of age at IHU Méditerranée Infection, at AP-HM, in French regions and in France overall.

245 *Mortality estimation according to the prevalence of antibodies tested after the first*
246 *outbreak*

247 In the Ile-de-France region as well as in the Grand-Est region, an excess of deaths could be
248 observed compared to what was expected (592 deaths per million inhabitants instead of 500 in
249 the Ile-de-France region and 647 deaths per million inhabitants instead of 450 in the Grand-
250 Est region) (Table 2). Conversely, the Sud and New Aquitaine regions had lower mortality
251 per million inhabitants than expected.

2 Table 2 – Mortality estimation according to the prevalence of antibodies after a delay.

3

Region	Population size (inhabitants)	Seroprevalence (%)	Number of estimated COVID-19 cases on the basis of seroprevalence	Number of estimated deaths using a 0.5% probability of death	Estimated COVID-19 mortality per million inhabitants	Number of observed deaths (as of June 2)	Ratio of estimated to observed deaths	COVID-19 mortality per million inhabitants
Ile-de-France	12,278,210	10	1,227,821	6,139	500	7,273	0.84	592
Grand-Est	5,511,747	9	496,057	2,480	450	3,565	0.70	647
New-Aquitaine	5,999,982	3.1	185,999	930	155	420	2.21	70
Bouches-du-Rhône	2,034,469	7.96	161,944	810	398	535	1.51	263

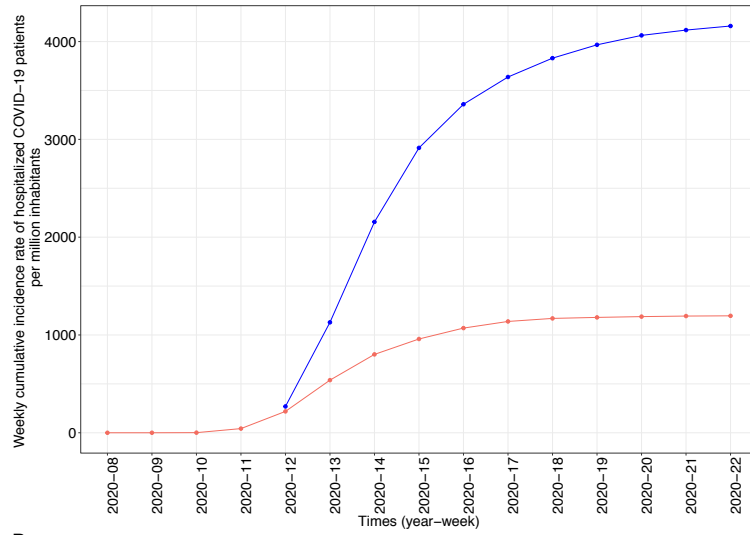
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255 *Focus on two French cities: Paris and Marseille*

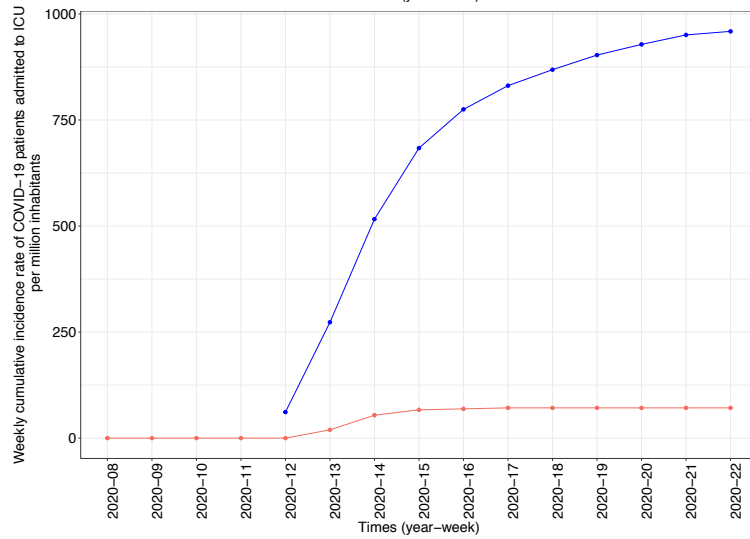
256 Significant differences, particularly in screening and treatment strategies, were observed
257 between Paris, where outpatients were not tested, and Marseille, where outpatients and
258 asymptomatic people were tested. The cumulative incidence rate of hospitalization was 4,159
259 patients per million inhabitants in Paris, which was significantly higher than the rate of 1,196
260 patients per million inhabitants in Marseille (p-value <0.001) (Figure 4A), suggesting a
261 preventive effect associated with broader testing. The number of individuals admitted to the
262 ICU in Paris (959 per million inhabitants) was also significantly higher than that in Marseille
263 (71 per million inhabitants) (p-value <0.001) (Figure 4B); moreover, 798 and 149 COVID-19
264 deaths per million inhabitants were observed in Paris and Marseille, respectively (Figure 4C).
265 Four patients (3.1%) (one woman and three men) living in Marseille died under the age of 60,
266 including one patient aged 56 years, 2 patients aged 58 years and one patient aged 59 years.
267 These patients had comorbidities: bronchopulmonary large cell lung cancer metastasizing to
268 the brain, diabetes, hypertension, early Alzheimer's disease, or a history of stroke or severe
269 ischaemic heart disease. A large number of missing data on the age of deceased patients in
270 Paris were observed, making analysis of the latter impossible. Paris had an excess mortality of
271 approximately 2,000 patients between 2020 and 2018/2019 (+21.2% vs 2018 and +21.9% vs
272 2019), whereas 384 (+7.7%) additional patients died compared to 2018 and 371 (+7.4%)
273 compared to 2019 in Marseille (Table 3). Moreover, there was a drop between – 23.8% and
274 1.7% in mortality in hospice or residential facilities for dependent elderly people in Marseille,
275 which was not the case in Paris (+70.8% vs 2018 and +61.6% vs 2019).

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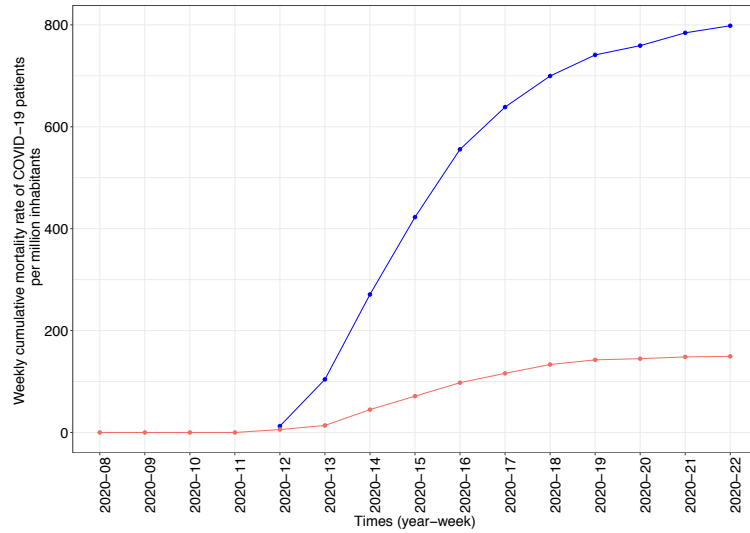
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A.



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Figure 4 – A. Weekly cumulative incidence of hospitalization of COVID-19 patients per million inhabitants in Paris (blue) and Marseille (red). B. Weekly cumulative incidence of intensive care unit (ICU) admission of COVID-19 patients per million inhabitants in Paris (blue) and Marseille (red). C. Weekly cumulative COVID-19-associated mortality per million inhabitants in Paris (blue) and Marseille (red).

285 Table 3 – Excess mortality in 2020 compared to 2018/2019 from January to August in Marseille and Paris. The data were collected from the INSEE
 286 database.

287

	2020 vs 2018				2020 vs 2019			
	Paris		Marseille		Paris		Marseille	
	N	Number of excess deaths (% excess)	N	Number of excess deaths (% excess)	N	Number of excess deaths (% excess)	N	Number of excess deaths (% excess)
Deaths from all causes	9,243	1,961 (21.2%)	5,015	384 (7.7%)	9,192	2 012 (21.9%)	5,028	371 (7.4%)
Deaths from all causes in public or private hospitals	5,960	806 (13.5%)	2,852	-164 (-5.8%)	5,830	936 (16.1%)	2,761	-73 (-2.6%)
Deaths from all causes in hospice or among dependent elderly residents in retirement homes	565	400 (70.8%)	248	59 (23.8%)	597	368 (61.6%)	302	5 (1.7%)
Deaths from all causes at home	2,319	737 (31.8)	1,732	70 (4.0%)	2,426	630 (26.0%)	1,812	-10 (0.6%)

288 **Discussion**

289 Mortality from an epidemic disease depends on several factors, the first being the size of the
290 epidemic, which can be assessed retrospectively by seroprevalence studies. Three countries,
291 namely, Spain, Italy and France, have conducted seroprevalence surveys and showed that
292 locked-down people tended to have more antibodies against SARS-CoV-2 than others,
293 suggesting that they were more prone to be exposed to the virus [18,25,26]. In a second step,
294 mortality by age group can be examined in comparable situations. In Figure 1, the natural
295 mortality, observable from three ships with outbreaks of CoV-2-SARS on board, was
296 extremely low, suggesting that in other contexts, mortality should be extremely low in healthy
297 people under 50 years of age [10-12]. Focusing only on mortality in the under-60 age group,
298 we observed that mortality was lower in Spain and Germany than in France. It was extremely
299 low in patients seen at Marseille IHU and significantly lower still in those who received
300 hydroxychloroquine and azithromycin treatment in all age groups [27]. This also translates
301 into a decrease in all-cause mortality in the Southern region of France compared to France
302 overall. Particularly, in the Ile-de-France region, the mortality rate among people under 60
303 years of age was twice that in the Southern region. Finally, if we project the estimated number
304 of deaths obtained by multiplying lethality by seroprevalence, the model very clearly shows
305 excess mortality in the Ile-de-France and Grand Est regions compared to the Bouches-du-
306 Rhône department [28,29]. Overall, it is difficult to dispute that despite similar epidemic
307 levels, there were more hospitalized patients, more transfers to intensive care units and more
308 deaths in Paris than in Marseille, and the correlation of all these parameters suggests that this
309 is not due to chance.

310 Countries in Europe and the Americas unquestionably need to reflect on the
311 management of their COVID-19 epidemics. It appears that the richest countries with the
312 highest level of care have had significantly higher mortality rates than the poorest countries

313 [30,31]. Among the reasons for this difference are the inability to rapidly develop diagnostic
314 tests in our country during the first months of the epidemic; the lack of immediate medical
315 care for patients, which was the consequence of the inability to meet the needs in terms of
316 testing; and the inadequacy of influenza-based recommendations when the disease is very
317 different from influenza (e.g., hypercoagulation problems and happy hypoxia), which led to
318 delays in the care and medicalization of these patients [3,7,9,32,33].

319 Furthermore, we believe that in developed countries, which are less familiar with
320 infectious diseases [31], strategies tending to privilege therapeutic trials over routine care
321 have led to delayed management and less efficient quality of care than in countries where the
322 immediate health of patients was prioritized over therapeutic trials. For example, in China, the
323 idea of not giving specific care was considered unethical, and doctors prescribed antivirals,
324 but no more than three [34]. The strategy in France, by contrast, was to give no treatment until
325 its effectiveness had been proven by randomized trials. This difference in strategies between
326 the rich Western world and the rest of the world is probably relevant to the very high
327 mortality rate observed in France.

328

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