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**1 Pattern of SARS-CoV-2 infection among dependant elderly residents living in long-term  
2 care facilities in Marseille, France, March-June 2020**

3

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38 **Running title:** dependant elderly residents and COVID-19

39

40 **Keywords:** COVID-19; SARS-CoV-2; elderly resident; long-term care facility; mass testing;  
41 hydroxychloroquine.

42 **Abstract (250/250 words)**

43 **Objectives.** We aimed to report the results of SARS-CoV-2 PCR-based screening campaigns  
44 conducted on dependent elderly residents (compared to staffs members) in long-term care  
45 facilities (LTCFs) in Marseille, France, and the follow-up of positive cases.

46 **Methods.** Data from 1,691 elderly residents and 1,000 members of staff were retrospectively  
47 collected through interviewing the medical teams in 24 LTCFs and using the hospitals'  
48 electronic health recording systems.

49 **Results.** Elderly residents were predominantly female (64.8%) with a mean age of 83.0 years.  
50 SARS-CoV-2 detection among residents (226, 13.4%) was significantly higher than among  
51 staff members (87, 8.7%), with  $p < 0.001$ . Of the 226 infected residents, 37 (16.4%) were  
52 detected on a case-by-case basis due to their COVID-19 symptoms and 189 (83.6%) were  
53 detected through mass screening. Most (77.0%) had possible COVID-19 symptoms, including  
54 respiratory symptoms and signs (44.5%) and fever (46.5%) and 23.0% were asymptomatic. 116  
55 (51.4%) patients received a course of oral hydroxychloroquine and azithromycin (HCQ-  
56 AZM) for  $\geq 3$  days, and 47 (20.8%) died. Through multivariate analysis, the death rate was  
57 positively associated with being male (30.7%, vs. 14.0%, OR=3.95,  $p=0.002$ ), being older than  
58 85 years (26.1%, vs. 15.6%, OR=2.43,  $p=0.041$ ), and receiving oxygen therapy (39.0%, vs.  
59 12.9%, OR=5.16,  $p < 0.001$ ) and negatively associated with being diagnosed through mass  
60 screening (16.9%, vs. 40.5%, OR=0.20,  $p=0.001$ ) and receiving HCQ-AZM treatment  $\geq 3$  days  
61 (15.5%, vs. 26.4%, OR=0.37,  $p=0.02$ ).

62 **Conclusion.** High proportion of asymptomatic COVID-19 patients and independent factors  
63 for mortality suggests that early diagnosis and treatment of COVID-19 patients in LTCFs may  
64 be effective in saving lives.

## 65 **Introduction**

66 In France, as of 2 June 2020, 10,350 elderly residents living in long-term care facilities or  
67 medical-social establishments had died from COVID-19 (27.6% lethality rate) accounting for  
68 55.6% of COVID-19 deaths in France [1]. Similar pictures have also been reported in many  
69 European countries [2] and worldwide [3]. The prevalence of chronic conditions such as  
70 cardiovascular diseases, hypertension and diabetes mellitus is high among elderly persons  
71 living in long-term care facilities; coronavirus disease (COVID-19) in this population may  
72 therefore have severe outcomes with a high mortality rate [2, 4, 5]. Other drivers of mortality  
73 among elderly persons living in long-term care facilities already include type of facility, the  
74 amount of persons visiting the facilities during the week previous to lockdown, staff ratios [3],  
75 and lagged infection in staff members [6].

76 The treatment of COVID-19 has been the subject of widespread controversy, in particular  
77 with regards to the use of hydroxychloroquine (HCQ) [7]. It appears to us that some of the  
78 elements of the controversy are the heterogeneity of protocols using HCQ, with doses ranging  
79 from 800 mg to 1200 mg per day, the duration of treatment, whether or not it is combined  
80 with azithromycin (AZM), and the stage of the disease at which patients were being treated. It  
81 can be considered that there is a purely viral phase of the disease with a more or less strong  
82 immune response, which can become predominant in what has been referred to as the  
83 cytokine storm, followed in a number of cases, by necrotic lesions, linked to pulmonary  
84 infarctions [8]. Furthermore, mortality depends very significantly on age and thus, in Europe,  
85 almost all deaths have been among persons over the age of 60, with more than 50% in persons  
86 over the age of 85 years [9]. Under these conditions, it is very difficult to carry out  
87 comparative studies addressing the effect of HCQ on COVID-19-associated deaths. Very few  
88 randomised studies have been conducted and their interpretations have also led to heated

89 debate. To assist the debate, we believe that it may be important to assess whether there is a  
90 clear reduction in mortality in the most at-risk groups.

91 In Marseille, over a period of approximately two months, we were able to test and treat  
92 COVID-19 patients in long-term care facilities (Etablissement d'Hébergement pour Personnes  
93 Agées Dépendantes –EHPAD) with a combination of HCQ-AZM, as we have described it on  
94 several occasions [8, 10-12]. The objective of this study was to estimate the prevalence of  
95 SARS-CoV-2 carriage among elderly residents and among staff members working in 24  
96 EHPAD, Marseille, France. We also aimed to estimate the lethality among elderly residents  
97 treated in these EHPADs and informally compare it to the lethality of patients in these EHPAD  
98 who were not treated and the general lethality of patients in EHPADs in France.

## 99 **Methods**

### 100 **Setting, study design and population**

101 SARS-CoV-2 cross-sectional mass screening campaigns were conducted among residents and  
102 staff members from 24 long-term care facilities (EHPADs) in Marseille, between 24 March  
103 and 2 June 2020. In some centres, screening campaigns were conducted following the  
104 diagnosis of confirmed COVID-19 cases in symptomatic patients who were sampled on a  
105 case-by-case strategy. In other centres, screening campaigns were conducted systematically.  
106 In all cases, screening campaigns were conducted following a request from the directors and  
107 medical staff of the long-term care facilities. Nasopharyngeal samples were processed for  
108 SARS-CoV-2 PCR testing at the Institut Hospitalo-Universitaire (IHU) Méditerranée Infection  
109 at Assistance Publique-Hôpitaux de Marseille (AP-HM), as previously described [13] or in  
110 private laboratories in Marseille, in some cases. Residents who tested positive were either i)  
111 treated at their long-term care facilities by local medical staff only, ii) treated at their long-  
112 term care facilities in coordination with the AP-HM Home Hospitalisation Unit (HHU), iii)

113 admitted to the IHU (day-care hospital or conventional units), or iv) transferred to AP-MH  
114 Intensive Care Units (ICU). For confirmed cases, information on demographics, chronic  
115 medical conditions, COVID-19 treatment and clinical data including fever, asthenia, anorexia  
116 and weight loss, respiratory symptoms and signs (cough, rhinorrhoea, dyspnoea, chest pain,  
117 acute respiratory distress syndrome) and death was collected retrospectively from interviews  
118 with the medical team of 24 long-term care facilities and the electronic health recording systems  
119 of the AP-HM.

## 120 **Statistical methods**

121 Statistical procedures were performed using STATA 11.1. We used Pearson's chi-square or  
122 Fisher's exact tests to compare differences between groups of patients where appropriate. A  
123 two-sided p-value of less than 0.05 was considered to be statistically significant. A separate  
124 logistic regression analysis was used to identify independent risk factors for SARS-CoV-2  
125 death prevalence among all elderly residents testing positive for SARS-CoV-2. The results  
126 were presented by percentages and odds ratio (OR) with a 95% confidence interval (95%CI).  
127 The initial model included variables presenting a p-value <0.2. The stepwise regression  
128 procedure and likelihood-ratio tests were applied to determine the final model.

## 129 **Results**

130 Over the study period, 1,691 elderly residents and 1,000 staff members were tested (Table 1).  
131 For residents, the sex ratio (male to female) was 1:1.8 and the mean age ( $\pm$  standard derivation  
132 [SD]) was 83.0 ( $\pm$ 10.6) years (ranging from 50 to 106 years). For staff members, the sex ratio  
133 was 1:3.5 and the mean age ( $\pm$  SD) was 40.8 ( $\pm$ 12.8) years (ranging from 18 to 87 years). It  
134 should be noted that two religious staff members at one long-term care facility were aged 75  
135 and 87, respectively.

136 Overall, 313 participants (of 2,691, 11.6%) were confirmed positive for SARS-CoV-2. The  
137 prevalence among residents (226 of 1,691, 13.4%) was significantly higher than among staff  
138 members (87 of 1,000, 8.7%),  $p < 0.001$ ). With regard to the housing facilities, at least one  
139 individual was positive in 11/24 (45.8%) centres with prevalence of SARS-CoV-2 detection  
140 ranging from 0% to 57.6% among residents and from 0% to 24.1% among staff members (Table  
141 1). The lethality rate among residents was 20.8% while no deaths occurred among staff  
142 members ( $p < 10^{-4}$ ).

### 143 **Characteristics of 226 elderly residents testing positive for SARS-CoV-2 (Tables 2 and 3)**

144 Of the 226 SARS-CoV-2-positive elderly residents, 37 were diagnosed on a case-by-case basis  
145 through selected sampling of patients with COVID-19 symptoms and 189 (83.4%) were  
146 detected through mass screening. Regarding co-morbidities, the most frequent chronic condition  
147 was hypertension (39.6%), followed by other cardiovascular diseases (37.1%), dementia  
148 (28.9%) and other mental disorders (23.6%). In terms of clinical findings, 77.0% had possible  
149 COVID-19 symptoms, including respiratory symptoms and signs (44.5%), and fever (46.5%);  
150 and 23.0% had no COVID-19 symptoms representing 24.8% (40/161) of individuals tested  
151 through mass screening (Table 2).

152 When it came to therapeutic management, 62 (27.4%) patients were managed within their  
153 long-term care facilities by local medical staff only, 117 (51.8%) were managed within their  
154 long-term care facility in collaboration with the HHU, 16 (7.1%) were admitted to IHU, and  
155 31 (13.7%) were transferred to ICU. Overall, 116 (51.4%) patients received an oral HCQ (200  
156 mg three times daily for ten days), and AZM (500 mg on day 1 followed by 250 mg daily for  
157 the next four days) for at least three days and were monitored as described in previous studies  
158 [10-12]. Of the 110 others (48.6%), one (0.4%) received a two-day course of HCQ-AZM, one  
159 (0.4%) received HCQ alone, 37 (16.4%) received AZM alone, and 71 (31.4) did not receive  
160 either drug. The prevalence of HCQ-AZM treatment for at least three days ranged from 0%-



161 87.5% according to the housing facilities. Other treatments are described in Table 2. A total of  
162 179 patients survived (79.2%) and 47 (20.8%) died.

163 The baseline characteristics of 116 patients who received HCQ-AZM treatment for at least  
164 three days compared with 110 patients who did not receive the treatment were largely similar  
165 (Table 3). A higher proportion of patients with a history of stroke was observed in the treated  
166 group (15.8%) compared with the untreated group (5.2%,  $p=0.04$ ).

167 Table 4 shows the lethality rate among elderly residents with SARS-CoV-2 infection, according  
168 to demographics, chronic conditions, circumstance of diagnosis, type of medical management  
169 of patients, use of HCQ-AZM and housing facility effect according to prevalence of HCQ-  
170 AZM treatment for at least three days in each housing facility. Under univariate analysis, death  
171 from COVID-19 was significantly associated with male gender. In addition, patients who were  
172 diagnosed on a case-by case basis due to their COVID-19 symptoms were more likely to die  
173 (40.5%) than those diagnosed through systematic screening (16.9%). Finally, patients who  
174 received oxygen treatment were more likely to die (39.0%) than those who did not receive such  
175 a treatment (12.9%), by contrast, patients who received HCQ-AZM treatment for at least three  
176 days were less likely to die (15.5%) than those who did not receive such a treatment (26.4%).  
177 Through multivariate analysis, the death rate was positively associated with being male  
178 (30.7% vs. 14.0%, OR=3.95 [1.65-9.44],  $p=0.002$ ), being older than 85 years (26.1% vs. 15.6%,  
179 OR=2.43 [1.04-5.69],  $p=0.041$ ), and receiving oxygen therapy (OR=5.16 [2.26-11.76],  $p<10^{-4}$ )  
180 and negatively associated with being diagnosed through mass screening (16.9%, vs. 40.5%,  
181 OR=0.20 [0.08-0.53],  $p=0.001$ ) and receiving HCQ-AZM treatment for at least three days  
182 (OR=0.37 [0.17-0.86],  $p=0.02$ ).

183

## 184 **Discussion**

185 In Marseille, the first case of COVID-19 in the general population was diagnosed on 3 March  
186 2020 and the epidemic peaked during the first week of April and remained active until the end  
187 of the month. Our survey of long-term care facilities began when the entire French population  
188 was placed under a strict lockdown (17 March) and when the epidemic was active in Marseille.  
189 All long-term care facilities became confined environments with very strict restrictions being  
190 place upon visits. We found a 13.4% SARS-CoV-2 positivity rate among dependant elderly  
191 residents in Marseille that was significantly higher than the 5.4% positivity rate among all  
192 French dependant elderly residents according to a national survey (37,405 confirmed cases in an  
193 estimated 695,060 French dependant elderly residents,  $p < 0.001$ , 2 June update) [1, 14]. We  
194 observed an overall 20.8% COVID-19 lethality rate among infected residents in Marseille that  
195 was significantly lower than that in all French long-term care facilities or medical-social  
196 establishments (27.7% lethality rate,  $p = 0.026$ , 2 June update) [1]. The main drivers of  
197 mortality in Marseille residents were older age and male sex, as already reported in many  
198 studies [15]. In addition, systematic screening by PCR was identified as an independent  
199 protective factor against death from COVID-19. A symptom-based diagnostic strategy is less  
200 effective in long-term care facilities, most likely because elderly patients with comorbidities  
201 such as chronic respiratory or cardiovascular diseases may be unable to accurately report new  
202 symptoms suggestive of COVID-infection or may present with atypical symptoms that  
203 challenge medical staff [13, 17]. Furthermore, in our experience, more than 23% of SARS-  
204 CoV-2 infected residents had no symptoms at the time of sampling. A very high prevalence  
205 (around 80%) was observed in a cross-sectional study conducted on elderly residents living in  
206 2074 Belgian long-term care facilities [18]. In this study, we show that there was a significant  
207 difference in lethality between patients treated with our standardised treatment and untreated  
208 patients, as already reported in study conducted among elderly patients living in a Spanish

209 public nursing home in the same period [14]. Treatment with HCQ alone was demonstrated to  
210 be associated with lower mortality in patients admitted with COVID-19 [20-23]. Another  
211 cohort study conducted among American patients with rheumatic conditions showed an  
212 association between long-term HCQ treatment and reduced COVID-19 lethality rate [24]. The  
213 potential mechanisms of HCQ in the decrease of mortality in COVID-19 might be its  
214 inhibitory effects upon the production of pro-inflammatory cytokines interleukin (IL)-1- $\beta$ ,  
215 TNF- $\alpha$  and IL-6, and chemokines (CCL2 and CCL3) involved in the recruitment of pro-  
216 inflammatory cells in the lung [25].

217 There are some limitations to our study. Our study population was not randomly and  
218 homogenously recruited. Data regarding demographics, chronic conditions and clinical status  
219 was not systematically documented. Frailty that has been shown to be a major risk factor for  
220 mortality in COVID-19 was not evaluated in this study due to its retrospective design [26]. The  
221 use of individual preventive measures was not documented.

222 Nevertheless, we believe that even if there are biases, as in any comparative study including  
223 randomisation, these biases are relatively neutralised by the multifactorial study. Above all,  
224 we demonstrate that the mortality in patients treated in EHPADs in Marseille was half that of  
225 patients in nursing homes across France who, in most cases very likely did not receive  
226 specific treatment since its use is restricted to the hospital setting [27, 28]. We believe that  
227 focusing on the population with the highest mortality, to show a significant effect, is  
228 important and agree in this sense with several studies that have shown a reduction in mortality  
229 of 30 to 50% by HCQ-AZM in populations most at risk [29, 8].

230

231 **Declarations**

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243

244 **Authors’ contributions statement:**

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246 Writing – review & editing: TD, DZ, VL, SA, SG, HM, MF, DM, OQ, PM, AM, PL, GD, BL,  
247 AM, AC, PA, PP, EC & DR

248 Conceptualization: PG

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360 **Table 1.** SARS-CoV-2 testing among residents and staff members at 24 long-term care  
361 facilities in Marseille, France, 27 March– 2 June 2020

362 **Table 2.** Comorbidities, symptoms and signs, diagnostic and therapeutic management among 226  
363 elderly residents testing positive for SARS-CoV-2.

364 **Table 3.** Characteristics of group receiving HCQ-AZ for at least 3 days and untreated group.

365 **Table 4.** Associations between multiple factors and SARS-CoV-2 deaths among 226 infected  
366 elderly residents (univariate and multivariate analysis)

367

**Table 1.** SARS-CoV-2 testing among residents and staff members at 24 long-term care facilities in Marseille, France, 27 March– 2 June 2020

Characteristics	Date of mass testing	Residents			Staff members			p-value <sup>1</sup>	p-value <sup>2</sup>	Total	
		No. tested	No. (%) positive	No. (%) deaths among positive cases (lethality rate)	No. tested	No. (%) positive	No. (%) deaths among positive cases (lethality rate)			No. tested	No. (%) positive
<b>Total</b>		<b>1691</b>	<b>226 (13.4)</b>	<b>47 (20.8)</b>	<b>1000</b>	<b>87 (8.7)</b>	<b>0 (0)</b>	<b>4.10<sup>-4</sup></b>	<b>&lt;10<sup>-4</sup></b>	<b>2691</b>	<b>313 (11.6)</b>
<b>Centre</b> <sup>(2691)</sup>											
Centre-01	01 April, 08 April, 19 April	99	57 (57.6)	17 (29.9)	83	20 (24.1)	0 (0)	2.10 <sup>-3</sup>	0.04	182	77 (42.3)
Centre-02	08 April, 19 April, 20 May	112	50 (44.6)	9 (18.0)	71	17 (24.0)	0 (0)	7.10 <sup>-3</sup>	0.053	183	67 (36.6)
Centre-03	20 April, 26 April, 04 May, 11 May, 18 May, 25 May, 02 June	52	23 (44.2)	2 (8.7)	35	7 (20.0)	0 (0)	2.10 <sup>-3</sup>	N/A	87	30 (34.5)
Centre -04	06 April, 21 April	89	24 (27.0)	8 (33.3)	108	12 (11.1)	0 (0)	7.10 <sup>-3</sup>	0.03	197	36 (18.3)
Centre -05	08 April, 29 April	37	10 (27.1)	3 (30.0)	32	1 (3.1)	0 (0)	0.035	N/A	69	11 (16.0)
Centre -06	08 April, 17 April, 22 April	230	45 (18.0)	7 (15.6)	180	15 (8.3)	0 (0)	2.10 <sup>-3</sup>	0.18	410	60 (14.9)
Centre -07	02 Avril, 27 April, 25 May	81	8 (9.9)	0 (0)	57	11 (19.3)	0 (0)	0.18	N/A	138	19 (13.8)
Centre -08	13 April, 06 May	77	7 (9.1)	1 (14.3)	24	1 (4.2)	0 (0)	0.67	N/A	101	8 (7.9)
Centre -09	21 April	54	0 (0)	N/A	44	3 (6.8)	0 (0)	0.08	N/A	98	3 (3.1)
Centre -10	23 April	46	1 (2.2)	0 (0)	12	0 (0)	N/A	N/A	N/A	58	1 (1.7)
Centre -11	15 April	118	1 (0.9)	0 (0)	60	0 (0)	N/A	N/A	N/A	178	1 (0.6)

Centre -12	15 April	66	0 (0)	N/A	18	0 (0)	N/A	N/A	N/A	84	0 (0)
Centre -13	28 April	96	0 (0)	N/A	39	0 (0)	N/A	N/A	N/A	135	0 (0)
Centre -14	30 April	45	0 (0)	N/A	12	0 (0)	N/A	N/A	N/A	57	0 (0)
Centre -15	17 April	64	0 (0)	N/A	27	0 (0)	N/A	N/A	N/A	91	0 (0)
Centre -16	22 April	48	0 (0)	N/A	19	0 (0)	N/A	N/A	N/A	67	0 (0)
Centre -17	25 April	61	0 (0)	N/A	29	0 (0)	N/A	N/A	N/A	90	0 (0)
Centre -18	15 April	52	0 (0)	N/A	18	0 (0)	N/A	N/A	N/A	70	0 (0)
Centre -19	27 April	32	0 (0)	N/A	24	0 (0)	N/A	N/A	N/A	56	0 (0)
Centre -20	27 April	29	0 (0)	N/A	15	0 (0)	N/A	N/A	N/A	44	0 (0)
Centre -21	24 April	25	0 (0)	N/A	11	0 (0)	N/A	N/A	N/A	36	0 (0)
Centre -22	20 April	53	0 (0)	N/A	22	0 (0)	N/A	N/A	N/A	75	0 (0)
Centre -23	14 April	100	0 (0)	N/A	52	0 (0)	N/A	N/A	N/A	152	0 (0)
Centre -24	24 April	25	0 (0)	N/A	8	0 (0)	N/A	N/A	N/A	33	0 (0)
<b>Sex</b> <sup>(2471)</sup>											
Female, n (%)		1,069 (64.8)	135 (12.6)	19 (14.1)	646 (77.7)					1705 (69.0)	
Male, n (%)		581 (35.2)	91 (15.7)	28 (30.8)	185 (22.3)					766(31.0)	
<b>Age (years)</b> <sup>(2556)</sup>											
Mean±SD		83.0±10.6	83.4±10.6	86.8±10.2	40.8±12.7					68.3±23.1	
Range (min-max)		50-106	56-103	59-103	18-87					18-106	
18-34, n (%)		0 (0)	N/A	N/A	326 (36.4)					326 (12.8)	
35-49, n (%)		0 (0)	N/A	N/A	292 (32.6)					292 (11.4)	
50-59, n (%)		34 (2.1)	3 (8.8)	1 (33.3)	236 (25.4)					270 (10.6)	
60-69, n (%)		189 (11.4)	25 (13.2)	3 (12.0)	38 (4.2)					227 (8.9)	
70-79, n (%)		348 (21.0)	46 (13.2)	5 (10.9)	1 (0.1)					349 (13.7)	
80-89, n (%)		552 (33.2)	78 (14.1)	16 (20.5)	1 (0.1)					553 (21.6)	
90-99, n (%)		505 (30.3)	67 (13.3)	19 (28.4)	0 (0)					505 (19.8)	
>99, n (%)		34 (2.1)	7 (20.6)	3(42.9)	0 (0)					34 (1.3)	

Abbreviation: N/A, not applicable;

<sup>1</sup>Comparison of positive testing prevalence between resident group and staff member group.

<sup>2</sup>Comparison of lethality rates between infected resident group and infected staff member group.

<sup>3</sup>Number of individuals for whom data was available.

**Table 2.** Comorbidities, symptoms and signs, diagnostic and therapeutic management among 226 elderly residents testing positive for SARS-CoV-2.

Parameters	n (%)
<b>Comorbidities</b> (159) <sup>1</sup>	
Hypertension	63 (39.6)
Cardiovascular diseases (other than hypertension)	59 (37.1)
Dementia	46 (28.9)
Mental disorder	39 (23.6)
Diabetes mellitus	25 (15.7)
Chronic lung diseases	19 (12.0)
Stroke	17 (10.7)
Cancer	15 (9.4)
Chronic neurological disorder	12 (7.6)
Obesity	7 (4.4)
Chronic kidney diseases	7 (4.4)
Asthma	3 (1.9)
<b>Symptoms and signs</b> (200)	
Respiratory symptoms and signs	89 (44.5)
Fever	93 (46.5)
Asthenia, anorexia, weight loss	21 (10.5)
No COVID-19 symptoms	46 (23.0)
<b>Circumstances of diagnosis</b> (226)	
Case-by-case testing in patients with COVID-19 symptoms	37 (16.4)
Mass testing	189 (83.6)
<b>Medical management of patients</b> (226)	
Managed at long-term care facilities by local medical staff only	62 (27.4)
Managed at long-term care facilities in coordination with the HHU	117 (51.8)

	Admitted to IHU	16 (7.1)
	Transferred ICU	31 (13.7)
<hr/>		
<b>HCQ-AZM therapy</b> <sup>(226)</sup>		
	At least a three-day course	116 (51.4)
	two-day course	1 (0.4)
	HCQ alone	1 (0.4)
	AZM alone	37 (16.4)
	No HCQ, no AZM	71 (31.4)
<hr/>		
<b>HCQ-AZM therapy at least a three-day course according to the housing facilities</b> <sup>(226)</sup>		
	Centre-07, n/N (%)	7/8 (87.5)
	Centre-01, n/N (%)	39/50 (78.0)
	Centre-02, n/N (%)	43/57 (75.4)
	Centre -05, n/N (%)	4/10 (40.0)
	Centre -06, n/N (%)	14/45 (31.1)
	Centre -04, n/N (%)	4/23 (17.3)
	Centre -03, n/N (%)	4/24 (16.7)
	Centre -08, n/N (%)	1/7 (14.3)
	Centre -10, n/N (%)	0/1 (0)
	Centre -11, n/N (%)	0/1 (0)
<hr/>		
<b>Oxygen therapy</b> <sup>(199)</sup>		59 (29.7)
<b>Ceftriaxone or ertapenem therapy</b> <sup>(199)</sup>		63 (31.6)
<b>Low-molecular-weight heparin therapy</b> <sup>(199)</sup>		24 (12.1)

Abbreviation: HCQ, hydroxychloroquine; AZM, azithromycin; HHU, Home Hospitalisation Unit, Institut Hospitalo-Universitaire; ICU, Intensive Care Units.

<sup>1</sup> Number of individuals for whom data was available.

**Table 3.** Characteristics of group receiving HCQ-AZ for at least 3 days and untreated group.

Characteristics		Patient receiving HCQ-AZ $\geq 3$ days N=116	Patient not receiving HCQ-AZ $\geq 3$ days N=110	p-value
<b>Demographic factors</b> <sup>(226)</sup> <sup>1</sup>				
Gender	Female, n (%)	70 (60.3)	65 (59.1)	0.85
	Male, n (%)	46 (39.7)	45 (40.9)	
Age (years) <sup>2</sup>	50-85, n (%)	66 (56.9)	49 (44.5)	0.07
	>85, n (%)	50 (43.1)	61 (55.5)	
<b>Chronic conditions</b> <sup>(159)</sup>				
Cardiovascular diseases	No, n (%)	51 (62.2)	49 (63.6)	0.85
	Yes, n (%)	31 (37.8)	28 (36.4)	
Hypertension	No, n (%)	46 (56.1)	50 (64.9)	0.26
	Yes, n (%)	36 (43.9)	27 (35.1)	
Dementia	No, n (%)	61 (74.4)	52 (67.5)	0.34
	Yes, n (%)	21 (25.6)	25 (32.5)	
Mental disorder	No, n (%)	61 (74.4)	59 (76.6)	0.74
	Yes, n (%)	21 (25.6)	18 (23.4)	
Diabetes mellitus	No, n (%)	69 (84.1)	65 (84.4)	0.96
	Yes, n (%)	13 (15.9)	12 (15.6)	
Chronic lung diseases	No, n (%)	72 (87.8)	68 (88.3)	0.92
	Yes, n (%)	10 (12.2)	9 (11.7)	

Stroke	No, n (%)	69 (84.2)	73 (94.8)	0.04
	Yes, n (%)	13 (15.8)	4 (5.2)	
Cancer	No, n (%)	74 (90.2)	70 (90.9)	0.86
	Yes, n (%)	8 (9.8)	7 (9.1)	
Chronic neurological disorder	No, n (%)	76 (92.7)	71 (92.2)	0.9
	Yes, n (%)	6 (7.3)	6 (7.8)	
Circumstances of diagnosis (226)	Case-by-case testing in patients with COVID-19 symptoms, n (%)	23 (19.8)	14 (12.7)	0.1
	Mass testing, n (%)	93 (80.2)	96 (87.3)	
Facility management of patients (226) <sup>3</sup>	In long-term care facilities only	0 (0)	62 (56.4)	N/A
	Other	116 (100)	48 (43.7)	
Oxygen therapy (199)	No, n (%)	79 (68.1)	61 (73.5)	0.4
	Yes, n (%)	37 (31.9)	22 (26.5)	
Ceftriaxone or ertapenem therapy (199)	No, n (%)	81 (69.8)	55 (66.3)	0.59
	Yes, n (%)	35 (30.2)	28 (33.7)	
Low-molecular-weight heparin therapy (199)	No, n (%)	98 (84.5)	77 (92.8)	0.08
	Yes, n (%)	18 (15.5)	6 (7.2)	

Abbreviation: HCQ, hydroxychloroquine; AZM, azithromycin; NA, Not applicable.

<sup>1</sup> Number of individuals for whom data was available.

<sup>2</sup> Median of the variable is used for analysis.

<sup>3</sup> Indication of HCQ-AZ treatment was compulsorily administrated in coordination with hospital.



**Table 4.** Associations between multiple factors and SARS-CoV-2 deaths among 226 infected elderly residents (univariate and multivariate analysis)

Characteristics		Deaths N=47	Survivors N=179	Univariate		Multivariate	
				OR [95% CI]	p-value	aOR [95% CI]	p-value
<b>Demographic factors</b> <small>(226)</small> <sup>1</sup>							
Gender	Female, n (%)	19 (14.0)	116 (86.0)	Ref		Ref	
	Male, n (%)	28 (30.7)	63 (69.2)	<b>2.71 [1.40-5.24]</b>	<b>0.003</b>	<b>3.95 [1.65-9.44]</b>	<b>0.002</b>
Age (years) <sup>2</sup>	50-85, n (%)	18 (15.6)	97 (84.4)	Ref		Ref	
	>85, n (%)	29 (26.1)	82 (73.9)	<b>1.90 [0.99-3.67]</b>	<b>0.055</b>	<b>2.43 [1.04-5.69]</b>	<b>0.041</b>
<b>Chronic conditions</b> <small>(159)</small>							
Cardiovascular diseases	No, n (%)	21 (21.0)	79 (79.0)	Ref			
	Yes, n (%)	12 (20.3)	47 (79.7)	0.98 [0.43-2.12]	0.92		
Hypertension	No, n (%)	23 (24.0)	73 (76.0)	Ref			
	Yes, n (%)	10 (15.9)	53 (84.1)	0.59 [0.26-1.36]	0.22		
Dementia	No, n (%)	28 (24.8)	85 (75.2)	Ref			
	Yes, n (%)	5 (10.9)	41 (89.1)	<b>0.37[0.13-1.02]</b>	<b>0.057</b>		
Mental disorder	No, n (%)	25 (20.9)	95 (79.1)	Ref			
	Yes, n (%)	8 (20.5)	31 (79.5)	0.98 [0.40-2.39]	0.96		
Diabetes mellitus	No, n (%)	27 (20.2)	107 (79.8)	Ref			
	Yes, n (%)	6 (24.0)	19 (76.0)	1.25 [0.45-3.43]	0.66		
Chronic lung	No, n (%)	26 (18.6)	114 (81.4)	Ref			

diseases	Yes, n (%)	7 (36.9)	12 (63.1)	<b>2.55 [0.91-7.12]</b>	<b>0.073</b>		
Stroke	No, n (%)	31 (21.8)	11 (78.2)	Ref			
	Yes, n (%)	2 (11.7)	15 (88.3)	0.47 [0.1-2.20]	0.34		
Cancer	No, n (%)	28 (19.4)	116 (80.6)	Ref			
	Yes, n (%)	5 (33.3)	10 (66.7)	2.07 [0.65-6.54]	0.215		
Chronic neurological disorder	No, n (%)	30 (20.4)	117 (79.6)	Ref			
	Yes, n (%)	3 (25.0)	9 (75.0)	1.30 [0.33-5.10]	0.71		
<b>Diagnostic and therapeutic management factors</b>							
Circumstances of diagnosis <sup>(226)</sup>	Case-by-case testing in patients with COVID-19 symptoms, n (%)	15 (40.5)	22 (59.5)	Ref		Ref	
	Mass testing, n (%)	32 (16.9)	157 (83.1)	<b>0.30 [0.14-0.64]</b>	<b>0.002</b>	<b>0.20 [0.08-0.53]</b>	<b>0.001</b>
Facility management of patients <sup>(226)</sup>	In long-term care facilities only	12 (19.4)	50 (80.3)	Ref			
	Other	35 (21.3)	129 (78.7)	1.13 [0.54-2.35]	0.74		
HCQ-AZM treatment for at least three days <sup>(226)</sup>	No, n (%)	29 (26.4)	81 (73.6)	Ref		Ref	
	Yes, n (%)	18 (15.5)	98 (84.5)	<b>0.51 [0.26-0.99]</b>	<b>0.047</b>	<b>0.37 [0.17-0.86]</b>	<b>0.02</b>
Housing facility effect <sup>3</sup> <sup>(226)</sup>	>75%	26 (22.6)	89 (77.4)	Ref			
	25%-75%	11 (20.0)	44 (80.0)	0.85 [0.38-1.89]	0.7		
	<25%	10 (17.9)	46 (82.1)	0.74 [0.33-1.67]	0.48		
Oxygen therapy <sup>(199)</sup>	No, n (%)	18 (12.9)	122 (87.1)	Ref		Ref	
	Yes, n (%)	23 (39.0)	36 (61.0)	<b>4.33 [2.1-8.89]</b>	<b>&lt;10<sup>-4</sup></b>	<b>5.16 [2.26-11.76]</b>	<b>&lt;10<sup>-4</sup></b>
Ceftriaxone or	No, n (%)	26 (19.1)	110 (80.9)	Ref			

ertapenem therapy (199)	Yes, n (%)	15 (23.8)	48 (76.2)	1.32 [0.64-2.71]	0.45
Low-molecular-weight heparin therapy (199)	No, n (%)	36 (20.6)	139 (79.4)	Ref	
	Yes, n (%)	5 (20.8)	19 (79.2)	1.01 [0.35-2.90]	0.97

Abbreviation: Ref, Reference; NA, Not applicable; OR, Odds-ratio; aOR, adjusted Odds-ratio; HCQ, hydroxychloroquine; AZM, azithromycin

<sup>1</sup> Number of individuals for whom data was available.

<sup>2</sup> Median of the variable is used for analysis.

<sup>3</sup> According to prevalence of HCQ-AZM treatment for at least three days among infected residents in each housing facility as seen in Table 2.

Bold lines indicate the variables recruited in initial multivariate mode.