Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Letter to the Editor

Impact of Omicron surge in community setting in greater Paris area

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To the editor,

The severe acute respiratory syndrome coronavirus 2 Omicron variant of concern was first identified in South Africa during November 2021 and has now become the dominant variant in Europe and worldwide. However, as the number of Omicron COVID-19 cases increased rapidly in South Africa, the rate of hospitalization due to Omicron infection seemed lower than that of Delta infections [1]. However, a report by the Imperial College London found no evidence of a lower rate of hospitalizations from Omicron compared with Delta infections in England [2].

The greater Paris area has experienced five coronavirus disease 2019 (COVID-19) surges: (a) March to May 2020 (Alpha variant), (b) September to November 2020 (Alpha), (c) March to May 2021 (Delta), (d) July to September 2021 (Delta), and (e) December 2021 to January 2022 (Omicron, ongoing).

We aimed to assess the impact and clinical severity of patients infected during the Omicron surge compared with the previous surges in a large community setting in France. We performed a cohort study including adult patients with a confirmed COVID-19 diagnosis (RT-PCR or antigen) between March 9, 2020 and January 11, 2022 and managed with Covidom, a telesurveillance solution for home monitoring of patients with COVID-19 in the greater Paris area [3]. When included by a physician or after a positive test, patients completed self-administered questionnaires on symptoms on a daily basis for 10 to 30 days, according to the symptom course. The self-reported data comprised respiratory rate, heart rate, systemic clinical signs (fever, fatigue, dizziness, shivers, tachycardia, or myalgia), respiratory clinical signs (cough, shortness of breath, chest pain, chest oppression), and digestive clinical signs (anorexia, nausea/vomiting, diarrhoea).

According to predefined thresholds, the questionnaires could generate two types of alerts:

1. Orange alert (mild priority: heart rate 100–120 beats/min; respiratory rate: 20–30 breaths/min; fever 38–40°C; mild dyspnoea; digestive disorders).
2. Red alert (suggests that the patient's condition may be deteriorating; top-priority alert; heart rate >120 beats/min; respiratory rate >30 breaths/min; fever >40°C; severe dyspnoea; major chest pain).

Outcome was also registered: unplanned hospitalization (including in intensive care unit), contact with the national emergency number (Service d'Aide Médicale Urgente), or admission to the emergency department.

Patient characteristics are presented as frequencies and percentages for qualitative variables and mean ± standard deviation for quantitative variables. Correlations between surges were determined with a χ^2 test for categorical variables and one-way analysis of variance for continuous variables. A p value of <0.05 was considered statistically significant in all analyses. Analyses were performed with the use of R software, version 3.6.1 (R Foundation for Statistical Computing).

Overall, a total of 225 248 patients were included in the study, including 72 394 from the last surge, which is greater than in the previous surges. Patient characteristics according to surge are presented in Table 1. Patients included during the Delta and Omicron waves were younger (mean age: 35.6 ± 13.0 and 38.4 ± 13.0 years vs. maximum 44.5 ± 14.5 years in surge 1; $p < 0.001$).

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Table 1
Characteristics of Covidom patients

	Surge 1	Surge 2	Surge 3	Surge 4	Surge 5
Dates	March 20, 2020–May 8, 2020	September 15, 2020–November 25, 2020	March 20, 2021–May 15, 2021	July 21, 2021–September 15, 2021	December 1, 2021–January 11, 2022
Patients, *n*	42 328	46 338	46 610	17 578	72 394
Male patients, *n* (%)	15 746 (37.2)	18 859 (40.7)	20 182 (43.3)	7611 (43.3)	30 115 (41.6)
Age (y), mean ± standard deviation	44.2 ± 14.5	42.0 ± 14.3	40.7 ± 14.1	35.6 ± 13.0	38.4 ± 13.0
Age repartition (y)					
<40	15 644 (37.0)	21 230 (45.8)	22 217 (47.7)	11 452 (65.1)	38 157 (52.7)
40–60	16 113 (38.0)	17 892 (38.6)	18 646 (40.0)	4627 (26.3)	25 353 (35.0)
60–70	3837 (9.1)	3836 (8.3)	3294 (7.1)	719 (4.1)	3325 (4.6)
70–75	4833 (11.4)	1646 (3.6)	1278 (2.7)	540 (3.1)	4569 (6.3)
>75	1901 (4.5)	1734 (3.7)	1175 (2.5)	240 (1.4)	990 (1.4)
Risk factors					
Body mass index (kg/m^2), mean ± standard deviation	25.8 ± 5.3	25.6 ± 5.7	26.6 ± 5.9	25.3 ± 5.4	25.4 ± 5.5
Hypertension, *n* (%)	4140 (9.8)	761 (1.6)	1568 (3.4)	410 (2.3)	815 (1.1)
Diabetes mellitus, *n* (%)	1689 (4.0)	433 (0.9)	789 (1.7)	251 (1.4)	648 (0.9)
Immunosuppression, *n* (%)	168 (0.4)	24 (0.1)	33 (0.07)	24 (0.1)	63 (0.1)
Chronic pulmonary disease, *n* (%)	4845 (11.4)	956 (2.1)	1466 (3.1)	510 (2.9)	1136 (1.6)
Chronic cardiac failure, *n* (%)	938 (2.2)	126 (0.3)	144 (0.3)	41 (0.2)	105 (0.1)
Active neoplasia, *n* (%)	549 (1.3)	152 (0.3)	207 (0.4)	54 (0.3)	126 (0.2)
Clinical symptoms, *n* (%)					
Respiratory symptoms	36 606 (86.5)	15 261 (32.9)	30 523 (65.5)	9525 (54.2)	36 042 (49.8)
Digestive symptoms	14 971 (35.4)	15 141 (32.7)	31 078 (66.7)	9792 (55.7)	32 647 (45.1)
Systemic symptoms	36 593 (86.5)	15 219 (32.8)	31 325 (67.2)	9848 (56.0)	37 513 (51.8)
Vaccine status, *n*/*N* (%)					
Complete with booster	—	—	—	—	1380/15 376 (9.0)
Complete without booster	—	—	—	—	9950/15 376 (64.7)
Incomplete	—	—	—	—	421/15 376 (2.7)
Not vaccinated	—	—	—	—	3625/15 376 (23.6)
Alerts, *n* (%)					
All alerts	531 467	152 544	201 971	65 945	216 920
Orange alerts	164 765 (31.0)	22 055 (14.5)	43 824 (21.7)	11 146 (16.9)	42 273 (49.5)
Red alerts	16 504 (3.1)	6175 (4.0)	17 347 (8.6)	4506 (6.8)	15 636 (7.2)
Outcome, *n* (%)					
National emergency contact	149 (0.4)	83 (0.2)	190 (0.4)	65 (0.4)	91 (0.1)
Hospitalization	63 (0.2)	107 (0.2)	237 (0.5)	60 (0.3)	40 (0.06)
Emergency unit	72 (0.2)	18 (0.04)	36 (0.08)	8 (0.05)	24 (0.03)

Significantly fewer patients with comorbidities were included in surge 5 ($p < 0.001$), and the proportion presenting with respiratory signs was lower (49.8% in surge 5 vs. maximum 86.5% in surge 1; $p < 0.001$). During surge 5, although the number of patients included was high compared with that in previous surges, the rate of orange and red alerts was significantly lower ($p < 0.0001$), as were the number of hospitalizations, national emergency contacts, and emergency unit requirements ($p < 0.0001$).

Of the 15 376 patients included in surge 5 who responded regarding their vaccination status, 73.7% were completely vaccinated (at least 2 doses, with or without booster shot), 2.7% were partially vaccinated (only one dose without history of COVID-19), and 23.6% were unvaccinated.

In our study, a huge increase in COVID-19 cases was registered between December 1, 2021 and January 11, 2022 compared with previous surges. However, the proportion of risk factors was lower, as was the rate of red alerts, hospitalizations, and emergency contacts. These data confirm that the Omicron surge is highly significant considering the number of cases but presents with a low rate of severe presentation and worsening.

The main limitation of this study is due to its retrospective design with nonexhaustive data. Furthermore, patient profiles between surges could differ due to several factors. Indeed, the level of immunity after four previous surges and high vaccination rates worldwide should be taken into account, as it may partially explain the lower severity during the Omicron surge. Also, the Omicron variant seems to be better able to infect people with pre-existing immunity (because of vaccination or a previous infection) than previous variants [4], although vaccines remain effective against hospitalization.

Our study shows that the Omicron surge will probably strongly affect health care systems despite its low rate of severe cases.

Transparency declaration

All authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Authors' contributions

AD, PJ, and FXL conceptualized the study. AD, LD, MD, and XM collected, analyzed, and interpreted the data. LD and MD conducted the statistical analysis. AD, LD, and FXL wrote the first draft of the manuscript. All authors revised the manuscript and approved the final version. AD had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Research ethics statement

This study was approved by the scientific and ethical committee of the Assistance Publique-Hôpitaux de Paris (IRB00011591).

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