Clinical Characteristics of Vulnerable Populations Hospitalized and Diagnosed with COVID-19 during Second Wave in Buenos Aires, Argentina.

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Abstract

There are a few in Argentina publications regarding the presentation of patients with COVID-19 requiring hospitalized and emergency care in vulnerable populations that compares the first and second wave, and it has few reports in developing countries. The objective is to determine whether in the care of vulnerable patients, to succeed against COVID-19, multiple public health tools and interventions necessary to minimize morbidity and mortality. The study is a prospective cohort investigation of 3028 patients during second wave with lab-confirmed COVID-19, who required any of the Health Centers response from April 1, 2021, to June 30, 2021. In a previous publication, our group analyzed the situation of hospitalized patients during the first wave in the same region, "Southeast Network" (SN), Buenos Aires Metropolitan Area (AMBA). SN with 1.8 million inhabitants residing in urban and rural areas. A total of 14 health centers with different levels of care complexity provide care to patients in the region. The information of each patient with COVID-19 evaluated by SN, was incorporated in an Epidemiological Dashboard. The investigation was designed and reported with consideration of observational studies in epidemiology. A total of 57.9% patients were men, and the mean age (SD) was 52.1 (13.5) years. Sixty four percent patients with pre-existing diseases, most frequent hypertension and diabetes, but diabetes, obesity, and cardiovascular disease presented higher risk. A total of 24.7% were hospitalized in Intensive Therapy Unit. The mortality of the cohort was 22.9%. Mortality was higher for patients aged 65 or more, and for those had some pre-existing disease. But, it was a slightly more than double that in the first wave, it is possible mainly due to the fact that more than doubled of patients in Second wave required hospitalization in ITU, compared to First wave. The patients presented greater severity of their medical condition at the time of their hospitalization. These findings were similar to those reported by other authors. Another possible cause of the high number of patients in the period studied is due to the fact that most of the hospitalized population had not been vaccinated. The health system was able to respond to the demand.

Introduction

The initial Argentina case of COVID-19 was reported on March 3, 2020[1], in the Buenos Aires Metropolitan Area (AMBA)[2]. On April 8, 2020, the virus was identified in patients hospitalized in the "Southeast Network" (SN)[3]. A network system was organized with public (unpaid) health centers to remedy inefficiencies in the management of information and coordination between the different health institutions. We reported our experience in the first wave of the pandemic regarding the presentation of patients with COVID-19 requiring hospitalization and emergency care in vulnerable populations [4]. We found that the strategies used to increase the availability of the number of hospital beds and human and technical resources since the beginning of the pandemic were essential to respond to the serious health situation. The cohort of our first work was characterized by substantial chronic health comorbidities, as in most reports every region of the world [5–9]. The population included patients who live in conditions of vulnerability, similar to the current study population. Mortality was higher for patients aged 65 or older (OR 2.42). Hypertension, mellitus diabetes, and cardiovascular disease showed a higher risk through

logistic regression. These observations are consistent with reports demonstrating that older persons and those with comorbidities have the highest risk of mortality related to COVID-19[10, 11].

In this study, we describe the hospital presentation and care of persons who required Southeast Network (SN) response and were ultimately diagnosed with COVID-19 in the second wave to offer actionable understandings to help to inform best practice.

Methods

Study design, setting, and population.

The study is a prospective cohort investigation of patients with lab-confirmed COVID-19 in the SN who required any of the Centers to respond from April 1, 2021, to June 30, 2021, a period spanning the peak of the second wave. The recruitment was consecutive.

We used a flow chart, following the STROBE guidelines[12].

The evaluation of the patient begins with triage in the emergency room, where the patient is classified as a suspected case of COVID-19. Swabbing for PCR determination of SARS-CoV-2 was performed.

While waiting for the PCR result, the patient was considered to be infected with SARS-CoV-2, and all precautions for personal protection and patient isolation were taken.

Clinical, laboratory and radiological evaluations were carried out.

The severity of the clinical picture is classified to determine the place of hospitalization and indicate the treatment.

The inclusion criteria were hospitalized patients. In the first stage of the study, patients with suspected and confirmed COVID were admitted. However, in the data analysis, only patients with a confirmed diagnosis of COVID-19 by PCR determination of SARS-CoV-2 in nasopharyngeal exudate were included. The exclusion criteria were patients without a confirmed diagnosis of COVID-19 and not hospitalized.

The investigation was designed and reported with consideration of observational studies in epidemiology reporting guidelines of the Health Ministry of Province of Buenos Aires (https://www.ms.gba.gov.ar/ssps/investigacion/DocTecnicos/TipoInvestigaciones-Identificacionriesgos.pdf. Accessibility verified November 5, 2021) [13]. Because the investigation was considered minimal risk, the requirement for consent was only verbal to patients or their relatives. (Ethics Committee, El Cruce Hospital N Kirchner).

All experimental protocols of the study were approved by the ethics committee of 'Hospital El Cruce', Argentina. COVID-19 was diagnosed by real-time reverse transcription–polymerase chain reaction (RT–

PCR) detection of SARS-CoV-2 from nasopharyngeal swabs. Molecular technique-based RT–PCR is considered the gold standard for COVID-19 diagnosis, and real-time RT–PCR detects the amplified SARS-CoV-2 genome[14].

The RT–PCR determination was centralized in one laboratory (El Cruce Hospital). Test results were available a median of 1–2 days after the SN encounter.

SN is a large periurban region, covering an area of 661 square kilometers, with 1.8 million inhabitants residing in urban, suburban, and rural areas. Argentina is considered a developing country with a high human development index (0.830 in 2018); however, there are significant structural development gaps and heterogeneities between different areas. The municipalities of the southeast region are located in the lowest ranking of the municipalities of the Province of Buenos Aires

A total of 14 health centers with different levels of care complexity provide care to patients in the region. The centers are administered by the Ministry of Health of the Nation, by Province of Buenos Aires, of both, and by municipalities (Supplementary appendix).

The SN medical response is 2 tiered. The first tier is provided by medical doctors (MDs) in the emergency room of each health center. All patients go to the emergency room, and the majority consult spontaneously in the center of their neighborhoods.

If the patients had symptoms compatible with COVID-19 and more severe illness, it was decided whether they should be hospitalized as suspected. The second-tier response in confirmed cases also comprises MD in Intensive Therapy Unit (ITU) stay, General Ward with oxygen therapy (GWo), or General Ward (GW) stay.

Data sources

The information of each patient with COVID-19 evaluated by SN was incorporated in an Epidemiological Dashboard created by specialists (CI, BL) from the design of software, especially for this project. The current investigation used an electronic medical record from April 8 and incorporated the diagnosis of suspected or known COVID-19. In the first stage, a "window" was established that allowed the visualization of the occupation and availability of beds by establishment and by sector. In the Dashboard, each patient had an identification (ID) generated automatically, name, identity document and address, gender, age, and date of admission were incorporated, and the system automatically generated the days of hospitalization. Clinical risk was adapted from the National Health Ministry guidelines[15] in three categories. Mild, when patients have unilateral radiological involvement and SatO2 is > 95%, the Internment in WGo, or WG is decided.

Moderately, when radiological involvement is bilateral, patients saturate below 95%, and they are admitted to WGo. Severe when they present ATS/IDSA (American Thoracic Society-ATS) (Infectious

Diseases Society of America -IDSA-) criteria: one of two major (-Need for invasive MRA- Septic shock) or three minor (-Tachypnea ≥ 30/min.- PaO2/FiO2 < 250, Confusion/disorientation Multilobar infiltrates, Urea > 42 mg/100 ml, Leukopenia (<4000/mm3), Plaquetopenia (< 100,000/mm3), Temperature < 36 °C, Hypotension requiring aggressive hydration). They are admitted to ITU. Safe discharge for the patient and for third parties was used for those patients who, in case of being discharged from the hospital, could not return home because they did not have or because they lived in crowded conditions and could not be isolated. A socioeconomic and food security survey was started, but its analysis was not yet completed; for this reason, it was not included in this study.

From the beginning, a monitoring and follow-up of the data entry was organized twice a day, morning and night, by the HEC technical team (DAV, OL, YA). A "Procedures Manual" was prepared and distributed among the users of the project.

Regarding the registry of the vaccinated population, it was partially registered in the database because the start of the vaccination of the population in our country began to take place in April 2021 for those over 60 with pre-existing diseases. For this reason, it was not included in the original protocol of registration.

Statistical analysis.

We analyzed the distribution of the characteristics of the entire hospitalized population and stratified it by type of bed (ITU, WGo, WG). The characteristics in relation to clinical and safe discharge were compared. We used descriptive statistics, $\chi 2$ and Fisher's exact test for categorical variables, and t and Wilcoxon's test for continuous variables. Additionally, to analyze risk factors, we used multivariate analysis and logistic regression. All analyses were performed using SPSS version 24 statistical software (IBM Corp). A $P \leq 0.05$ was considered statistically significant, and all the tests were 2-tailed.

Results

From April 1, 2021, to June 30, 2021, 3,313 patients with lab-confirmed COVID-19 in the SN were hospitalized, but patients with incomplete data were excluded, remaining 3028 patients in total for the analysis of this work.

The highest percentage of occupancy of beds, at the most critical moment of the second wave, was for ITU, 87%, In GWo 60% COVID-19 patients, and for GW 20% COVID-19.

In Figure 1, it is shown that in the SN, two moments could be observed, as in our country, and in most countries. During the first wave, 15 patients began in the SN on March 15, 2020, with a peak on August 30 of 348 patients. A total of 1495 hospitalized patients were registered in that period. Then, a sustained and progressive decrease in subjects was observed. In February 2021, there were 70 cases, observing a doubling of patients on March 31, the beginning of the 2nd wave, with 137 patients. In one month, the

number of hospitalized patients tripled, with 413 patients maintaining stability, until mid-June. From this date, a progressive decrease in cases began to be seen until August 31, with a total of 90 hospitalized patients.

Figure 1. Total hospitalized patients during the first and second waves

On the horizontal axis, the 1st day for the first wave (June 1, 2020) and for the second wave (March 1, 2021).

In relation to follow-up, of total patients 3028, 1405 (46,4%) cases were discharged to their home, 651 (21,5%) of patients died, 393 (13%) subjects were discharged extrahospital isolation, 388 (12.8%) individuals were transferred out of southeast network, and 191 (6.3%) patients remain hospitalized (Table 1). There were 179 patients who were transferred from ITU to GWo or Gw.

Table 1

Follow-up of Patients Hospitalized with Coronavirus Disease in Health Centers of Southeast Network

Follow up of patients hospitalized	No. (%)
Discharge Home	1405 (46.4)
Discharge Extrahospital isolation	393 (13)
Transfer out of Southeast network	388 (12.8)
Remain Hospitalized	191 (6.3)
Deaths	651 (21.5)
Total	3028

Table 2

Characteristics of Patients Hospitalized with Coronavirus Disease 2019 in Health Centers of Southeast Network. [1] Missing sex information 9 patients

Characteristics	No. (%)
Male	1747 (57.9)
Women[1]	1272 (42.1)
Age mean (SD)	52.1 (13.5)
Pre-existent diseases [2]	1686 (63.7)
Pre-existent diseases	**No. (%)**
Hypertension	605 (22.9)
Mellitus diabetes	465 (17.6)
Chronic lung disease	176 (6.6)
Cardiovascular disease	119 (4.5)
Severe obesity	275 (10.4)
Chronic kidney disease	61 (2.3)
Immunosuppression	59 (2.2)
Cancer	48 (1.8)
previous covid d	19 (0.7)
Other	589 (22.2)
Total[3]	2647
Missing	381 (12.6)

[2]Patients with at least one registered pre-existing disease.

[3]Total pre-existing diseases registered; some patients had more than one disease.

A total of 1747/3019 (57.9%) patients were men, and the mean age (SD) was 52.1 (13.5) years (Table 2).

Of the total population studied, we were able to obtain information on their health history in 2647 (87.4%) patients and 1686 (63.7%) patients with chronic comorbidities. A total of 690 patients (24.4%) were hospitalized in ITU; of this group, 541 (78.4%) subjects had at least one pre-existing disease, and the most frequent were hypertension (45.1%; 244/541) and diabetes (36.6%; 198/541). In GWo and GW, 2140 (75.6%) patients were admitted; of this group, 1273 (59.5%) patients had pre-existing disease, and the most frequent were hypertension 32.7% (416/1273) and diabetes 24.7% (314/1273).

The mortality of the cohort was 22.9% (651) out of a total of 2837 patients, and those who were still hospitalized at the time of cutoff of this study were excluded. When analyzed by hospitalization sector, we observed that in ITU, the mortality was 62.1% (516/831), while in GWo and GW, it was 6.2% (135/2185).

Mortality did not present significant differences between sexes. The mean age was 52.1 (SD 13.5). Among the risk factors, those with the highest risk in decreasing order were mellitus diabetes, aged 65 or more, hypertension and cardiovascular disease and severe obesity (Table 3).

Table 3

Mortality, characteristics of this population, and risk factors.

Mortality No. (%) All patients 651 (22.9)		**Chi Square Test (Total Patients/ Mortality Patients)**	**Odds Ratio 95% CI (Lower/Upper)**
Gender	371(Male)/ 278(Female)	p = 0.001	2.23 (1.82/2.74)
Pre- existing diseases#	491 (76.7)	p < 0.001	
Age. Group 65 or more	181 (27.8)	p < 0.001	2.42 (1.96/2.98)
#Severe obesity	98 (15.3)	p < 0.001	1.86 (1.43/2.43)
#Immunosuppression	17 (2.7)	p = 0.400	
#Hypertension	218 (34.1)	p < 0.001	2.13 (1.45/3.11)
#Cancer	18 (2.8)	p = 0.030	1.90 (1.05/3.44)
#Mellitus diabetes	187 (29.2)	p < 0.001	2.56 (2.07/3.17)
#Cardiovascular disease	47 (7.3)	p < 0.001	2.13 (1.45/3.11)
#Chronic lung disease	48 (7.5)	p = 0.321	
#Chronic renal disease	16 (2.5)	p = 0.705	

For patients with pre-existing diseases aged 65 or older (OR 2.42; 95% CI 1.96/2.98), was the variable with the greatest weight in the logistic regression. Among the pre-existing patients, those with the highest risk in decreasing order were severe, mellitus diabetes, obesity, cardiovascular disease and hypertension (Table 4).

Table 4

Mortality, logistic regression, comparing deceased patients (651) vs. the total population included missing cases.

Variables	B	Error estándar	Wald	gl	Sig.	Exp(B) (95 CI Lower/Upper)
Age group (65 or more/up to 64)	0.675	0.116	34.082	1	0.000	1.965 (1.566/2.465)
Severe obesity	0.672	0.140	22.994	1	0.000	1.959 (1.488/2.579)
Mellitus diabetes	0.766	0.116	43.882	1	0.000	2.151 (1.715/2.697)
Cardiovascular disease	0.610	0.202	9.158	1	0.002	1.841 (1.240/1.733)
Hypertension	0.391	0.111	12.476	1	0.000	1.479 (1.190/1.838)

In relation to the vaccination of the hospitalized population, there was information in 48,1% (1.431/2.973) of subjects. Most of the subjects had not received any vaccines, and less than a quarter of patients had received one dose, of which 83.27% (262) were subjects older than 50 years. (Table 5).

Table 5

Vaccination of the hospitalized population

Vaccinated	n (%)
One Dose	299 (20.9)
Two Doses	12 (0.8)
No Vaccinated	1120 (78.3)
Total	1431

Discussion

In this cohort investigation, SN was involved in 3028 hospitalized patients in just 3 months April-June 2021, compared to the first wave, almost twice as many patients and half the time. In the second wave, in Argentina, a total of 2.144.754 cases were reported in this period[16], and there was no discrimination between hospitalized patients and outpatients. Additionally, the increase in patients was greater in the second wave, almost six times more than 2020.

We reviewed indexed and nonindexed publications on hospitalized patients with a diagnosis of COVID-19 in Argentina, and we found some published works. These publications present a selection of the studied

population different from our work; however, the results in relation to risk factors and mortality are similar to our findings[18-20,] which presents a perspective different from that carried out by us.

The health system in our region allocates 90% of the availability of beds in ITU to the pandemic, among suspected and confirmed patients, and almost 80% for the General Ward. This situation certainly has a strong impact on the care of patients with other diseases who receive regular care and has not yet studied this effect.

The cohort was characterized by an average age of 52.1 years, comparable to the first wave, and similar to that reported in Argentina[17] but was younger than most publications in developed countries[18– 20]. This may be due to the gap between developed and developing countries in relation to the population pyramid profile. In Latin America, which is also observed in Argentina, those under 15 years of age represent 25.2%, and the population and those over 60 years are 15.1%[21,22]. In developed countries, those over 60 reach, in some countries, double that percentage [18]. More than half of the patients were men, as well as referred to most authors [7,19].

The cohort was characterized by substantial chronic health comorbidities in 1686 (63%) patients, and these observations are consistent with most reports in every region of the world[19,21-23].

This condition of extreme vulnerability does not necessarily mean a risk factor for more severe illness or mortality. This could be because despite the economic and social deficits of the health system, a major increase in the number of hospital beds in the area and optimization of the resource utilization of ICUs can effectively offer a response to our people.

The mortality of the cohort was 22.9%, which was higher for patients aged 65 or more (OR 2.42) and for those with some pre-existing disease (OR 2.56). Logistic regression showed that mellitus diabetes, hypertension, cardiovascular disease and obesity were associated with a higher risk. These observations are consistent with reports demonstrating that older persons and those with comorbidities have the highest risk of mortality related to COVID-19 [24,25].

In ITU, mortality was 62.1%, while in GWo and GW, it was 6.2%. These data do not differ significantly from what was observed in the first wave, 58.2% and 3.5%, respectively. However, in contrast with the first wave, in which the mortality was 9.8%, in this period, the mortality was slightly more than double. We consider that the increase observed is mainly because more than a doubled number of patients in the second wave required hospitalization in ITU (23%) compared to the first wave (13%) of patients. These findings were similar to those reported by other authors[17, 18].

Another possible cause of the high number of patients in the period studied is because most of the hospitalized population had not been vaccinated. In our country, health personnel and the elderly 60 years were prioritized at the beginning of the vaccination program. This decision was made by the government because there were a limited number of vaccines. As of August 2021, more than 80% of the population over 18 years of age was covered with the vaccine because more doses of vaccine were received.

The creation of the network to link all the health centers in the region and clinic records makes it a valuable public health investigative tool that can help to define clinical strategies for patient care during the pandemic.

Conclusions

In this cohort involving SN response, in a developing country, urban poverty in Argentina remained (40.9% of the population), while extreme poverty increased to 10.5% in 2020-2021. In
SN, the socioeconomic situation is even worse, especially in the care of vulnerable patients.

The strategies that we use in our experience to face the pandemic, in particular the increase in the availability of the number of available hospital beds and human and technical resources since the beginning of the pandemic, were essential to respond to the serious health situation. We consider that may be useful for other regions with similar socioeconomic conditions.

Declarations

Data availability

The Availability of data and materials section refers to the raw data used in your study and presenting tables and figures is not sufficient to state that all data is contained within the manuscript and additional files. Please only use this statement if you have indeed provided all raw data on which your study is based. We strongly encourage all authors to share their raw data, either by providing it in a supplementary file or depositing it in a public repository and providing details on how to access it in this section. If you do not wish to share your data, please clearly state this in this section along with a justification. Data availability statements can take one of the following forms (or a combination of more than one if required for multiple datasets): Some of the datasets generated and/or analyzed during the current study are available in the Hospital El Cruce N Kirchner repository (https://repositorio.hospitalelcruce.org/xmlui). The other datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Ethical approval.

The investigation was designed and reported with consideration of observational studies in epidemiology reporting guidelines of the Health Ministry of Province of Buenos Aires. Because the investigation was considered minimal risk, the requirement for consent was only verbal to patients or their relatives. All experimental protocols of the study were approved by the ethics committee of 'Hospital El Cruce', Argentina(There are not a number from ethics committee).

Consent for publication.

I confirm that because the investigation was considered minimal risk, the requirement for consent was only verbal to patients or their relatives. (Ethics Committee, El Cruce Hospital N Kirchner).

References

1. Ministry of Health of the Nation. Social, preventive and compulsory isolation decree n°297/2020. Available at . Accessibility verified November 1, 2021.
2. Government of the City of Buenos Aires. What is AMBA? Available at Accessibility verified November 1, 2021.
3. https://www2.hospitalelcruce.org/index.php/component/content/article/65-institucional/3732-red-sudeste?Itemid=540. Accessibility verified November 1, 2021.
4. Yacobitti, A., Otero, L., Doldan Arrubarrena, V. *et al.* Clinical characteristics of vulnerable populations hospitalized and diagnosed with COVID-19 in Buenos Aires, Argentina. *Sci Rep* 11,9679 (2021).
5. Contou, D., Fraissé, M., Pajot, O. *et al.* Comparison between first and second wave among critically ill COVID-19 patients admitted to a French ICU: no prognostic improvement during the second wave?. *Crit Care* 25**,** 3 (2021). https://doi.org/10.1186/s13054-020-03449-6
6. Grasselli, G. *et al.* Baseline characteristics and outcomes of 1591 patients infected with SARS-CoV-2 admitted to ICUs of the Lombardy Region Italy. *JAMA* 323(16), 1574–1581. https://doi.org/10.1001/jama.2020.5394.14 (2020).
7. Gupta, S. *et al.* Factors associated with death in critically Ill patients with coronavirus disease 2019 in the US. *AMA Intern. Med.* https://doi. org 10.1001/jamainternmed.2020.3596 (2020).
8. Richardson, S. *et al.* Presenting characteristics, comorbidities, and outcomes among 5700 patients hospitalized With COVID-19 in the New York City Area. *JAMA* **323**(20), 2052–2059. .
9. Salinas-Botrán A, Sanz-Cánovas J, Pérez-Somarriba J et al. Clinical characteristics and risk factors for mortality upon admission in patients with heart failure hospitalized due to COVID-19 in Spain. Rev Clin Esp. 17 de julio de 2021. Doi: 10.1016/j.rce.2021.06.004. Epub ahead of print. PMID: 34305156.
10. World population prospects: The 2015 revision, key findings and advance tables. Working Paper No. ESA/P/WP.241. New York, UN, 2015. https://esa.un.org/unpd/wpp/publications/files/keyfindingswpp_2015.pdf. Accessibility verified November 2, 2021
11. Karagiannidis, C. *et al.* Case characteristics, resource use, and outcomes of 10,021 COVID-19 patients admitted to 920 German hospitals: An observational study. *Lancet Respir Med* https://doi. org/10.1016/S2213-2600(20)30316-7 (2020).
12. https://www.strobe-statement.org/. Accessibility verified November 2, 2021
13. https://www.ms.gba.gov.ar/ssps/investigacion/DocTecnicos/TipoInvestigaciones-Identificacionriesgos.pdf. Accessibility verified November 5, 2021.

14. Park, G.-S. *et al.* Development of reverse transcription loop-mediated isothermal amplification assays targeting severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). *J. Mol. Diagn.* 22, 729–735. https://doi.org/10.1016/j.jmoldx.2020.03.006 (2020).
15. National Health Ministry guidelines. https://www.argentina.gob.ar/salud/coronavirus/atencion-manejo-casos. Accessibility verified November 5, 2021.
16. Institute of clinical and health effectiveness. Accessibility verified November 1,2021.
17. Boietti B.R, Mirofsky M, Valentini R, et al. Descriptive analysis of 4776 patients received in medical clinic services by covid-19. results of the argentine multicentric registry - rema-covid-19. Medicina (Buenos Aires) ISSN 1669-9106
18. A. González-Castro, E. Cuenca Fito, A. Fernandez, P. Escudero Acha, J.C. Rodríguez Borregán, Y. Peñasco. First and second wave of coronavirus-19 disease: A comparative study in patients hospitalized in an ICU of a third-level university hospital Marqués de Valdecilla, Santander, España. DOI:
19. G. Fan, Z. Yang, Q. Lin, S. Zhao, L. Yang, D. He. Decreased case fatality rate of COVID-19 in the second wave: a study in 53 countries or regions. Transbound Emerg Dis., (2020), http://dx.doi.org/10.1111/tbed.13819
20. Menéndez Colino R, Merello de Miguel A, Argentina F, et al. Evolution of covid-19 at nursing homes from the second wave to vaccination. Description of a coordination program between primary care, geriatrics and public health. Rev Esp Salud Pública. 11 de mayo de 2021; 95: e202105071.PMID: 33973566Revista española de salud pública, ISSN-e 1135-5727, N°. 95, 2021
21. https://www.worldbank.org/en/country/argentina/overview. Accessibility verifed January 18, 2021 Accessibility verified November 11,2021.
22. Center for the Implementation of Public Policies for Equity and Growth (CIPPEC).
23. World population prospects: The 2015 revision, key findings and advance tables. Working Paper No. ESA/P/WP.241. New York,UN, 2015. https://esa.un. org/unpd/wpp/publications/files/key_findings_wpp_2015.pdf. Accessibility verified August 18, 2020
24. Karagiannidis, C. et al. Case characteristics, resource use, and outcomes of 10,021 COVID-19 patients admitted to 920 German hospitals: An observational study. Lancet Respir Med https://doi. org/10. 1016/S2213- 2600(20) 30316-7 (2020).
25. Ning Rosenthal, Zhun Cao, Jake Gundrum, Jim Sianis, Stella Safo. Risk Factors Associated With In-Hospital Mortality in a US National Sample of Patients With COVID-19. JAMA Netw Open. 2020 Dec; 3(12): e2029058. Published online 2020 Dec 10. doi: 10.1001/jamanetworkopen.2020.29058

Figures

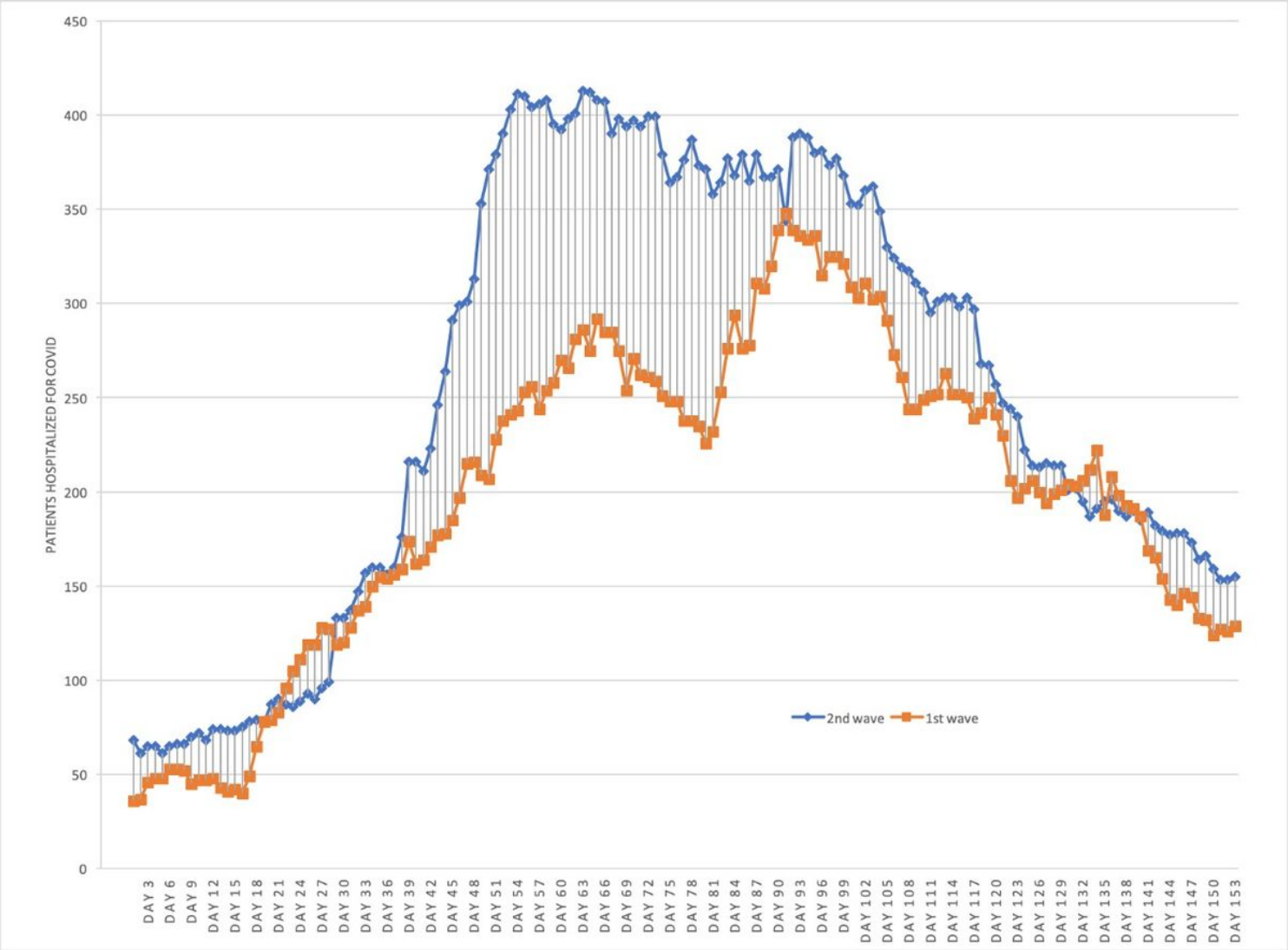

Figure 1

Total hospitalized patients during the first and second waves

On the horizontal axis, the 1st day for the first wave (June 1, 2020) and for the second wave (March 1, 2021).

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- SuplementaryInformationSNHospitals.pdf