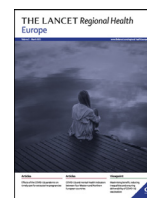


Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

The Lancet Regional Health - Europe

journal homepage: www.elsevier.com/lanepe

Commentary

Intensive care units, the Achilles heel of France in the COVID-19 battle

Djillali Annane^{a,*}, Laura Federici^e, Jean-Luc Chagnon^b, Jean Luc Diehl^c, Didier Dreyfuss^d, Philippe Guiot^f, Etienne Javouhey^g, Nicolas Joram^h, Olivier Lesieurⁱ, Jean Philippe Rigaud^k, Hervé Outin^j, Arnaud Sement^l, Chantal Sevens^m, Didier Théveninⁿ, Samia Touati^o, Nicolas Terzi^p, Trade Union of Intensive Care Physicians

^a General Intensive Care Unit, Hôpital Raymond Poincaré (APHP), Université de Versailles SQY and Université Paris Saclay, 104 boulevard Raymond Poincaré, 92380 Garches, France

^b General Intensive Care Unit, Centre hospitalier de Valenciennes, Valenciennes, France

^c Service de médecine intensive, Hôpital Européen Georges Pompidou, Université de Paris, Paris, France

^d Université de Paris, INSERM UMR S1155, Paris, France

^e Intensive Care Unit, CH Sud Francilien, 116, Boulevard Jean Jaurès 91106 CORBEIL-ESSONNES, France

^f General Intensive Care Unit, GHR Mulhouse Sud Alsace, Mulhouse, France

^g Pediatric Intensive Care Unit, Hôpital Femme Mère Enfant, Hospices Civils de Lyon, Université Lyon 1, Lyon, France

^h Service de réanimation Pédiatrique, CHU Nantes, France

ⁱ Intensive Care Unit, Saint Louis Hospital, La Rochelle, France

^j Médecine Intensive Réanimation, Centre Hospitalier Intercommunal de Poissy - Saint-Germain-en-Laye 10 rue du Champ Gaillard, BP 3082 - 78303 Poissy Cedex, France

^k Intensive Care Unit, Dieppe General Hospital, Dieppe, France

^l Réanimation Polyvalente, Centre Hospitalier Mont de Marsan, Urrugne, Nouvelle-Aquitaine, France

^m Union Trade of Intensive Care Physicians, Maison de la Réanimation, 50 Avenue Claude Vellefaux, Paris, France

ⁿ Médecine Intensive Réanimation, Centre Hospitalier de Lens, Lens, France

^o Réanimation medico-chirurgicale, Groupement hospitalier public du sud de l'Oise, Creil, France

^p INSERM U1042, University Grenoble Alpes, Medical Intensive Care Unit, Grenoble, France

ARTICLE INFO

Article History:

Received 20 December 2020

Revised 25 January 2021

Accepted 25 January 2021

Available online 29 January 2021

From January 3, 2020 to January 13, 2021, France reported 2,760,259 cases of COVID-19 with 68,419 deaths [1] and ranked the sixth country. After Ebola and Zika crises, France promoted universal health coverage to achieve global health security [2]. COVID-19 pandemic demonstrates that French initiative was mothballed after the 2017 presidential election. The Defence Council takes decisions during closed meetings without involvement of civil society, local stakeholders or affected populations, and without transparency. There were insufficient mechanisms for surveillance, alert, diagnosis and plans for crises responses. As a result, France failed foreseeing the insufficient hospital capacity to handle massive surge of critical cases, and securing universal access to healthcare. In 2006, there were 10.7 beds per 100,000 inhabitants. In January 2020, the number of ICU beds per capita was eight per 100,000 (about 5400). It was lower than the average capacity of 185 countries [3]. France has lower

availability and accessibility of ICU beds, and more regional disparities than Germany, Luxembourg and Austria [4]. Differences in ICU resources were associated with differences in COVID-19 related case fatality ratio [4]. After the first wave, there were 502 and 119 deaths per million inhabitants in France and Germany, respectively. Up to first week of March, there were around 45 ICU patients nationwide. As of March 16, while there were more ICU patients than ICU beds [5] President Emmanuel MACRON proclaimed the general lockdown. The Ministry of Health halted non-COVID-19 healthcare activities to mount temporary ICU facilities. The surge of ICU patients peaked at about 7000 patients in April 10. Operating rooms, post-operative care rooms, coronary care units, stroke units, intermediate care units were converted into ICUs. Most of these temporary units could not meet regulatory requirements for setting/equipment and staff resources [6]. They were mostly run by doctors and nurses without critical care experience. By end of May, while the number of hospitalized cases returned to levels equivalent to those observed in February [5] temporary ICUs were dismantled. Albeit the high likelihood of a second wave after the summer, France strategy continued to rely on temporary units not on increasing permanent ICUs capacity [7]. Of 296 surveyed ICU directors, 114 (39%) declared 1641 and 1663 permanent beds as of January 1st and November 1st, respectively, and 670 temporary beds. As of November 1st, ICU overflow triggered long-distance (including to neighbouring countries) transfers of ICU patients, and a second general lockdown. Approximately 30% of non-COVID-19 related care were suspended to mount temporary ICU beds. This reduced access to care for non-COVID patients may be

* Corresponding author.

E-mail address: Djillali.annane@aphp.fr (D. Annane).

associated with worse outcomes [8]. A recent study suggested increased in-hospital mortality associated to ICU overflow and temporary ICU beds [9]. There were significantly more COVID-19 related deaths between October 1st and January 12 than between March 1st and September 30 [5]. The major drawback to increasing permanent ICU beds capacity was the shortage in staff resources. French regulation set the nurses to ICU patients ratio at two for five [6]. Thirteen percent of ICU directors declared that they cannot meet this requirement on a 24/7 basis and the frequent use of overtime. Likewise, undersized medical teams, i.e. less than three full time attending physicians per 4 ICU beds, ran most ICUs [10]. These degraded working conditions are a major determinant of nurse burnout and dissatisfaction [11], and may explain the unacceptably high proportion of caregivers (2.8% of physicians and 3.5% of nurses) having left intensive care following the first pandemic wave.

In anticipation of a third pandemic waves or new emergent threats, France should urgently restore an average of 12 permanent ICU beds per 100,000 inhabitants ensuring homogeneous distributions across territories. To this end, the 670 temporary beds set-up closed to or within ICU walls should be immediately converted to permanent beds. France should align ICU resources to those of other countries [3,4] with recognizing the specific competencies of ICU nurses [12] and salary increase, increasing staff resources with ratios of nurses to patients of at least 1:2 per shift, and of physician to patients of 3:4 per ICU. The annual output of trained ICU physicians should immediately double from 74 per year to at least 150 in 2021.

Author Contributions

All authors have equally contributed to the design, conduct and interpretation of the survey, and to the writing of this manuscript. CS has taken responsibility of logistic support. DA, LF and NT have taken responsibility of collecting and analysing survey data, and of writing the first draft of the manuscript. DA as the president of the French Union of Intensive Care Physicians is responsible for the dissemination of this information and for submitting the manuscript to the Journal.

Declaration of Interests

Authors have no conflict of interest to disclose.

References

- [1] WHO emergency dashboard. <https://covid19.who.int/region/euro/country/fr>. Accessed on January 13, 2021.
- [2] Hollande F. Towards a global agenda on health security. *Lancet* 2016;387(10034):2173–4 Epub 2016 May 1. doi: 10.1016/S0140-6736(16)30393-2.
- [3] Sen-Crowe B, Sutherland M, McKenney M, Elkbuli A. A closer look into global hospital beds capacity and resource shortages during the COVID-19 pandemic. *J Surg Res* 2020;260:56–63. doi: 10.1016/j.jss.2020.11.062.
- [4] Bauer J, Brüggmann D, Klingelhöfer D, Maier W, Schwettmann L, Weiss DJ, Gronenberg DA. Access to intensive care in 14 European countries: a spatial analysis of intensive care need and capacity in the light of COVID-19. *Intensive Care Med*; 46(11):2026–34. doi: 10.1007/s00134-020-06229-6.
- [5] Santé Publique France. COVID-19: point épidémiologique du 7 Janvier 2021. <https://www.santepubliquefrance.fr/maladies-et-traumatismes/maladies-et-infections-respiratoires/infection-a-coronavirus/documents/bulletin-national/covid-19-point-epidemiologique-du-7-janvier-2021>. Accessed 12 January 2021.
- [6] Décret n° 2002-466 du 5 avril 2002 relatif aux conditions techniques de fonctionnement auxquelles doivent satisfaire les établissements de santé pour pratiquer les activités de réanimation, de soins intensifs et de surveillance continue et modifiant le code de la santé publique (troisième partie: décrets simples). Texte n°12. *J Off Répub Française* 2002;82(7). <https://www.legifrance.gouv.fr/eli/decret/2002/4/5/MESH0220983D/jo/texte>. Accessed January 13 2021.
- [7] Castex J. Discours du premier ministre - conférence de presse sur l'application des mesures contre la covid-19. 2020. <https://www.gouvernement.fr/partage/11817-discours-du-premier-ministre-conference-de-presse-sur-l-application-des-mesures-contre-la-covid-19>. Accessed January 13 2021.
- [8] Kontis V, Bennet JE, Rashid T, et al. Magnitude, demographics and dynamics of the effect of the first wave of the COVID-19 pandemic on all-cause mortality in 21 industrialized countries. *Nat Med* 2020. doi: 10.1038/s41591-020-1112-0.
- [9] Taccone FS, Vangoethem N, Depauw R, et al. The role of organizational characteristics on the outcome of COVID-19 patients admitted to the ICU in Belgium. *Lancet Reg Health Europe* 2020. doi: 10.1016/j.
- [10] Lesieur O, Messika J, Touati S, et al. How many physicians in intensive care units in France? A position statement of the French union of intensive care physicians. *Méd Intensive Réanim* 2019;28:353–61.
- [11] Aiken LH, Clarke SP, Sloane DM, Sochalski J, Silber JH. Hospital nurse staffing and patient mortality, nurse burnout, and job dissatisfaction. *JAMA* 2002;288(16):1987–93. doi: 10.1001/jama.288.16.1987.
- [12] Nurses & allied healthcare professionals. INACTIC: international nursing advanced competency-based training for intensive care. Esicm; 2020. <https://www.esicm.org/the-esicm/naip>. Accessed January 15 2021.