



# Impact of COVID-19 pandemic on paediatric surgical training across Europe

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Dear Editor

The rapid spread of COVID-19 had a tremendous impact on healthcare systems and the medical community, as resources were diverted towards priority setting. In many specialties, both non-urgent and urgent activities were reduced or postponed<sup>1</sup>. Although children were marginally affected by the pandemic, paediatric surgical services were significantly affected<sup>2</sup>. Moreover, the entire medical educational system, and particularly surgical training, was compromised as was the well-being of trainees<sup>3</sup>. The changes and challenges imposed by the pandemic on trainee education are largely under-reported. This study aimed to assess the effects of the pandemic on paediatric surgical resident activity and training throughout Europe.

An anonymous survey was conducted among paediatric surgery centres across Europe between November 2020 and January 2021 (Table S1). The questionnaire consisted of 30 closed-end and multiple-choice questions, divided into three sections: general information; impact of COVID-19 on overall department activity; and influence on trainee-specific activities and/or teaching.

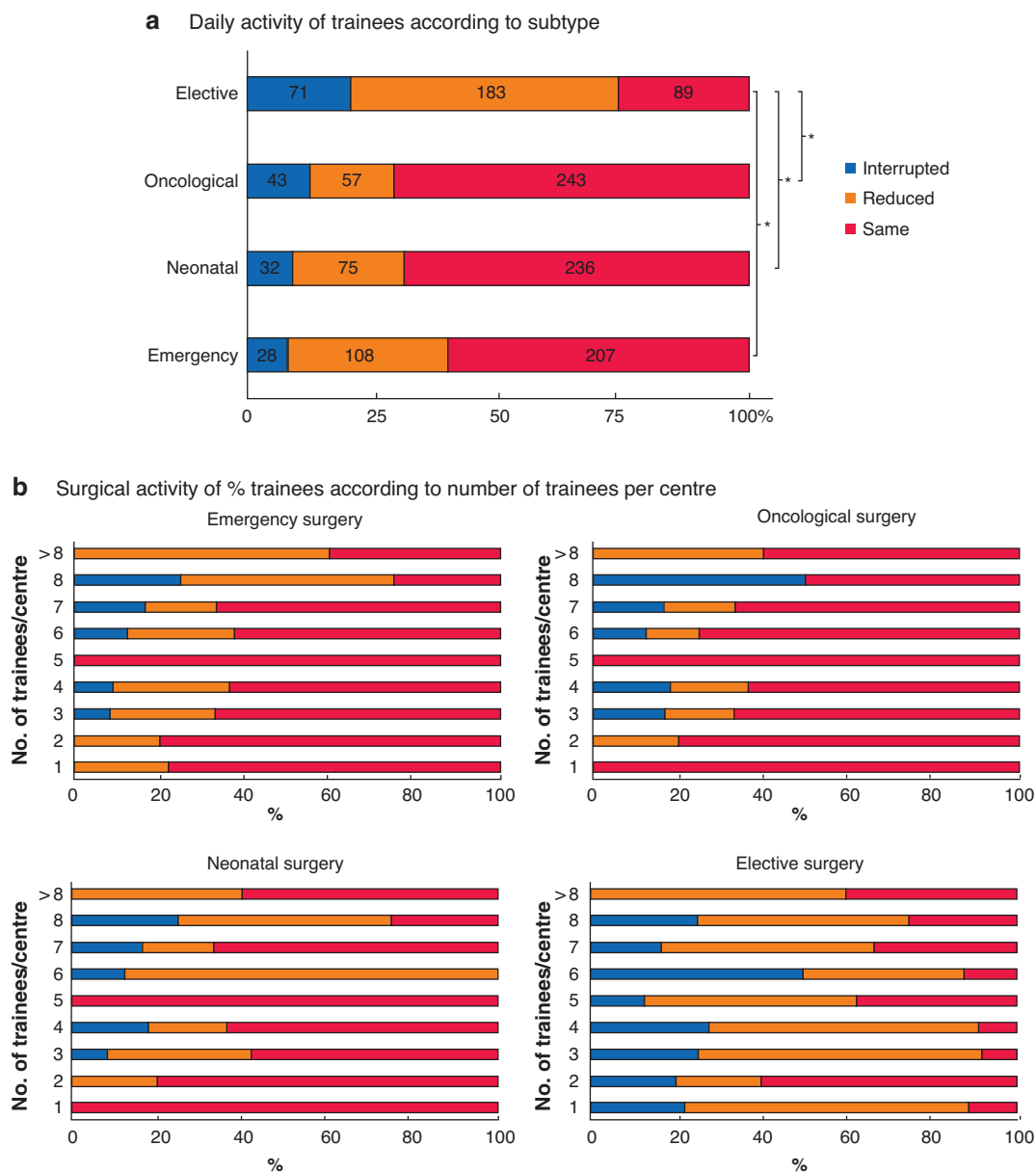
A total of 343 surgeons answered, from 68 centres across 10 European countries. Responders originated mostly from high-volume centres ( $n=57$ , 86 per cent). Since the pandemic outbreak, 75 per cent of the responding centres had been

treating patients with COVID-19 only as an emergency. Ten centres (15 per cent) were COVID-19-free hospitals. Redeployment of surgeons towards COVID-dedicated units was observed in 26 centres (38 per cent).

The activities mostly affected by the pandemic were operations and outpatient visits, whereas ward rounds were maintained overall. Elective procedures were significantly reduced in 34 centres (50 per cent), and completely interrupted in 19 (28 per cent), compared with other types of surgery ( $P=0.04$ ) (Fig. 1a). A significant difference between centres with few and many trainees was observed for emergency ( $P=0.001$ ), neonatal ( $P<0.001$ ), and oncological surgery ( $P<0.001$ ), whereas no variation was found in elective surgery ( $P=0.5$ ) (Fig. 1b).

Multidisciplinary meetings and teaching were fully interrupted in 31 centres (46 per cent) and reduced in 24 (35 per cent); 82 per cent of centres shifted towards virtual webinars. Only 12 per cent of centres provided constant access to surgical simulators. In contrast, clinical and basic research was preserved; 29 centres (43 per cent) declared the same activity as before the pandemic, and 37 reported having the same or an increased number of scientific publications (54 per cent).

Pandemic-related restrictions limiting non-emergency operations resulted in decreased surgical volume for trainees<sup>4</sup>, inevitably raising concerns about the learning curve and completion of educational requirements<sup>4</sup>.



**Fig. 1** Modifications of daily activity of trainees according to subtype, and of surgical activity of trainees according to number of trainees per centre **a** Daily activity of trainees according to subtype. Numbers in bars represent number of trainees involved. \* $P = 0.040$  (2-way ANOVA). **b** Surgical activity of trainees according to number of trainees per centre.  $P < 0.001$  for emergency, oncological, and neonatal surgery (2-way ANOVA).

The present analysis showed two principal outcomes: an overall reduction in elective surgery for paediatric surgery trainees, and reduced exposure to surgical oncology and neonatal surgery in academic centres with the smallest number of trainees. Therefore, extension of training deadlines, and increasing rotation of trainees from surgical centres with the smallest to those with a larger volume, could be considered in order to ensure uniform training.

During the pandemic, the majority of international academic activities were either cancelled or postponed, or held virtually. Similarly, trainee education transitioned to virtual formats. This study raised a critical point regarding the availability of surgical training facilities, with few centres providing access to simulation systems or virtual learning opportunities. In this context, integration of smart technologies is critical to

maintain adequate expertise and satisfaction, and to improve continuous surgical education<sup>5</sup>. Interestingly, research activities rely on the type of research conducted. Several trainees were unable to access laboratories or a university campus, whereas others reported increased research activity, with more time spent on ongoing projects or conducting non-clinical research.

This constitutes a large series investigating the experience of paediatric surgical residents during the COVID-19 pandemic in Europe. It provides a comprehensive overview of education, clinical practice, and well-being imposed by the pandemic, and has identified several important trends, including an overall reduction in surgical exposure, especially for emergency, neonatal and oncological surgery, and an increase in virtual learning.

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## Disclosure

The authors declare no conflict of interest.

## Supplementary material

[Supplementary material](#) is available at *BJS* online.

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