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Changes in patterns of activity at a tertiary paediatric neurosurgical centre during the first wave of the 2020 pandemic.

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### **Declarations**

No specific funding was received to support this work.

The authors report no conflicts of interest/competing interests.

Count data only have been used, so ethics was not required.

Patient consent to participate and for publication were not required.

Reasonable requests for primary data will be supported where possible.

IJ, HS, KH, HZ-S and RI conceived of the idea; IJ, HS and RI extracted and analysed the data; IJ and RI wrote the manuscript.

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Dear Editor:

On Wednesday March 11<sup>th</sup> 2020, the World Health Organization (WHO) declared a global pandemic of COVID-19 – the disease caused by SARS-CoV-2, a novel coronavirus. In the UK, the first cases had been reported at the end of January 2020 and the first death in early March.

Whilst there is evidence that globally children and young people (CYP) so far represent a relatively small proportion of serious infections and deaths from COVID-19 [5], they have been impacted in a myriad of unexpected ways. This is reflected in the way they have accessed healthcare (or more accurately, had healthcare accessed on their behalf). Changes in patterns of Paediatric Emergency Department attendances [2,4], accessing of community care [2], and increased acuity at the time of attendance at hospital [2, 3] have all been reported. The epidemiology of specific pathology has also changed, for example patterns of fractures [1].

In paediatric neurosurgery, some pathology might be expected to decrease as a result of pandemic interventions such as “lockdown” e.g. head trauma sustained outside of the home, but other pathology would be expected to continue at background rates e.g. brain tumours. Other measures such as school closures, will have resulted in decreased visibility of CYP and disruption of access to normal sources of support, and this may have had an impact on presentations to neurosurgical services e.g. abusive head trauma.

CYP under outpatient care and with direct access to a member of the hospital-based team might also engage with services in a different way during the pandemic, particularly early on when little was known about the impact on this age group.

We aimed, therefore, to describe patterns of urgent referrals and specialist nurse access at a UK regional paediatric neurosurgical centre in the first six months of 2020.

For urgent referrals received by the on-call paediatric neurosurgeon, data were examined for the 6 months January-June in 2020 and the same period in 2019. A four-year mean for the first half of the years 2016-2019 was also used for comparison, to address the likely variation between years given the small numbers.

For the specialist nurse access (phone call data), a comparison was made between 2020 and 2019, and weekly data also examined to allow for any background increase in calls in the second half of 2019. Calls were recorded as “answered”, “busy”, or “unanswered”, and an assumption made that they were independent events.

In the first six months of 2020, the centre received 226 urgent referrals, a decrease of 13.1% compared to the same period in 2019 and 7.8% compared to the four-year mean. Compared to 2019, March and May had the biggest single-month decreases in referrals, each of about a third (34.1% and 30.8% respectively). This phenomenon was also observed when compared to the four-year mean, although the size of the decrease was reduced to 29.7% for March and 15.3% for May.

The most frequent urgent referrals, across all years, were for head injuries, including skull fractures and intracranial haemorrhages, hydrocephalus, including newly diagnosed hydrocephalus and shunt problems, and brain and spinal tumours. *See Table 1.*

In the first half of 2020 there were 2750 more calls to the specialist nurses than in the first half of 2019 (4291 vs 1541 calls). *See Figure 1.* For 6.1% of callers (261/4291) in 2020 the line was busy which had not been the case previously (0/3372). There were 2.8 times as many answered calls in the first six months of 2020 compared to the same period in 2019 (3460 versus 1258).

Our data reveals that during the first six months of 2020, referrals to the paediatric neurosurgical inpatient team decreased, particularly in March, when compared to 2019 and the four-year mean. This is likely due to a combination of behavioural factors and may conceal some late presentations of important and treatable pathology. In contrast, calls to the dedicated specialist nurses increased several fold reflecting concern amongst parents and carers in a globally unprecedented scenario.

We acknowledge that our data is from a single centre however, this pattern of reduced urgent inpatient referrals and increased demand for telephone advice is likely replicated across other tertiary centres around the world. This

has implications for planning and delivery of services in future periods of lockdown. Proactively communicating with the parents/carers of children known to the service is recommended to address concerns over the likely impact of COVID-19 on neurosurgical conditions.

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**Table 1.** Numbers of urgent referrals for the three most common categories of diagnosis.

Category	Number of referrals		
	Jan-Jun 2020	Jan-Jun 2019	Mean Jan-Jun 2016-2019
Head injuries	83	87	70
Hydrocephalus	72	97	87
Brain and spine tumours	23	20	27

**Figure 1.** Number of calls made to the specialist nurse phone, by week and call status, January 2019 – June 2020.

