survey has taken place since 2012. The COVID-19 pandemic brought new challenges to paediatric training (and meant that many of the usual metrics to assess training across the region became obsolete) and in September 2020, The School conducted an abbreviated, tailored survey to capture experiences of trainees, and challenges faced in training during a pandemic.

Objectives To ascertain the ways in which London paediatric trainees were impacted by the emergency operational response to the first wave of the COVID-19 pandemic.

To provide rapid feedback to training centres to inform the response to any subsequent surges.

Methods 950 (769 in programme) London Paediatric trainees were surveyed about their March-September 2020 training placement. Online survey was emailed directly, with reminders, and promoted via social media. Five closed questions addressed overall placement satisfaction (excellent to poor), performance areas (morale, educational supervision, teaching and rest/catering facilities), and specific impact of covid-19. Three free text questions addressed the impact of covid-19, positive practices and initiatives, and areas of improvement.

Results There were 638 responses, with 566 from in-programme trainees (74% of in-programme trainees). 83.4% trainees rated their placement excellent/good (2019, 84%) and 5.8% rated it poor/below average (2019, 4%). There was inter-sector variability, with higher number of poor/below average ratings in the sector with most disruption to service.

147 (23%) trainees were seconded from their placement, 102 (16%) to another paediatric department and 45 (7%) to an adult department. 102 (16%) trainees worked additional antisocial hours to cover for seconded colleagues, and 165 (26%) worked additional antisocial hours for other reasons. 38 (6%) trainees had no direct patient contact. Only 125 trainees (20%) reported that their work was not impacted by COVID. Other ways in which work was impacted included: cancelled OOP (11), PICU taken over for adult patients (13), department closed without redeployment (5).

The performance area most impacted by the pandemic was the provision of educational supervision. There was improvement in provisions for rest, food and drink.

Thematic analysis of the free text identified that good team relationships, senior support and a supportive work environment were key to a positive training experience. Challenges faced were around teaching, lack of learning opportunities and poor communication. 8% of trainees highlighted that lack of communication worsened their training experience.

Conclusions The survey shows that overall, the excellent standards of training were maintained during the first wave, despite evidence of significant disruption to services. The highlighted challenges can be used to guide training provision during the ongoing pandemic, and ensure that trainees continue to receive the highest standard of training.

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RAPID WHOLE GENOME AND EXOME SEQUENCING IN CRITICALLY ILL CHILDREN: A REVIEW OF CLINICAL UTILITY AND CHALLENGES

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Background Genetic disorders are one of the leading causes of death in children admitted to neonatal and paediatric intensive care units. Genome wide sequencing (GWS), including whole genome sequencing (WGS) and whole exome sequencing (WES), uses child and parent blood samples to diagnose genetic disorders. *Rapid* GWS (rGWS) has a turn-around time of days to weeks allowing early diagnosis and intervention. rWES has become a standard component of early diagnostic workup and screening in critically ill children across the UK.

Objectives This review aims to evaluate the clinical utility and limitations of rGWS services in critically ill children.

Methods Literature was searched using the database *Medline*. Search terms included 'Children' and 'rapid sequencing'. Of 96 papers, 16 primary studies were selected for comparison.

Results Studies evaluated rGWS in cohorts with median ages ranging from 7.5 days to 2.96 years. Patients were selected primarily from neonatal, paediatric or cardiac intensive care units. Diagnostic yield for rGWS, defined by the probability that the test will establish a diagnosis, ranged from 30% to 80% (mean 48%) compared to standard genetic test estimates of 10%. WGS demonstrates superiority over standard genetic tests in detection of pathogenic variants and diagnosing disorders with high genetic heterogeneity. Patients receiving the highest diagnostic yields often presented with congenital anomalies or phenotypes involving neurological, cardiovascular or renal disorders. However, the association between specific phenotypes and diagnostic yield remains controversial. Often the number of phenotypic criteria with which the child presented was positively correlated with successful diagnosis. Diagnoses may be more common in patients with a history of intrauterine growth restriction or failure to thrive.

An average of 81% of patients with successful diagnoses via rGWS subsequently received altered management, compared to 2% of those with standard genetic testing. Common management changes included avoidance of invasive investigation or treatment, targeted investigations and screening, preventative measures, sub-specialist evaluations, definitive treatment or surgery, and palliative care commencement. Genetic and reproductive counselling may constitute the majority of management changes. In those diagnosed by rGWS, 61% avoided morbidity (22% avoiding *major* morbidity) with no prevented morbidities in standard care cohorts. Mortality outcomes were controversial: in those diagnosed, mortality ranged from 11–31% whilst 21–29% mortality was observed in undiagnosed groups.

The median turnaround time to written report was between 7.2 and 50 days (mean 16 days). However, time to blood sample analysis was more rapid and verbal reports were conveyed immediately when diagnosis would change management. rWGS was cost effective across multiple countries compared to standard genetic tests. Service challenges were primarily in optimising work flow, including efficient patient selection and sustained communication between multidisciplinary teams.

Conclusions rGWS is superior to standard genetic testing in critically ill children with regards to sensitivity, rate, diagnostic yield, management outcomes and cost effectiveness. Practical challenges can be managed with effective work flow plans and interdisciplinary communication. Future research is required to investigate the possible benefits of targeting specific phenotypes and a full UK health economics study is required to assess rGWS cost efficiency within the NHS system.