

## **Online Paediatric Clinical Examinations in the COVID-19 Era: An Acceptable Alternative**

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### **Abstract**

The SARS-CoV-2 pandemic has necessitated significant adaptation to medical education. A significant proportion of teaching has moved online, and innovative approaches have been required in all areas, including assessment. Provision of the clinical examination has presented a particular challenge. This year it was considered impractical and unsafe to carry out clinical examinations in person due to the SARS-CoV-2 pandemic. Therefore, in our institution, clinical examinations in paediatrics were moved online. Prior to summative assessment, teaching was provided using a similar format to the examination in order to improve assessment literacy. The summative clinical assessment was held using Zoom software and included history-taking, knowledge of paediatric clinical examination and communication. Retrospective analysis showed a significant correlation between students' performance in the online clinical examination, other methods of assessment and their overall grade. In the absence of a traditional clinical examination, this method appears to be an acceptable alternative.

Significant adaptations to medical education have been required since the beginning of the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) pandemic. In March 2020, teaching for the vast majority of students, in our institution and beyond, moved online. This necessitated innovative approaches to teaching and assessment<sup>1-3</sup>. The provision of the clinical examination, in particular, presented a challenge to medical schools and a variety of online formats have been used<sup>4-7</sup>.

In recent years, students in Paediatrics in Trinity College Dublin (TCD) have completed a summative clinical assessment at the end of the academic year, in addition to a written Clinical Data Interpretation Examination (CDIE) and Multiple-Choice Question (MCQ) examination.

Clinical skills assessment involved directly observed standardised-patient histories and clinical examinations of children in both inpatient and outpatient settings. This year it was considered impractical and unsafe to carry out these clinical examinations in person due to the SARS-CoV-2 pandemic. Firstly, many children with chronic illness were considered high risk if infected with SARS-CoV-2. Secondly, social distancing was challenging to implement considering the numbers of students, staff and patients required. The clinical examinations were therefore conducted entirely online.

Prior to summative assessment, teaching was provided using a similar format to the examination in order to improve assessment literacy. Essential clinical teaching was continued online in an alternative format to traditional bedside tutorials to ensure the students' clinical exposure could be focused on patient contact. Small-group online tutorials were facilitated, using clinical vignettes, with the clinical tutor acting as the patient's parent in an online simulated setting. The tutor also facilitated discussion regarding examination findings, diagnoses and management plans.

This format translated to the summative end of year examinations. Twenty clinical scenarios, aligned with the learning outcomes for the module, were devised. Zoom software (Zoom Video Communications, Inc, San Jose, California) was employed. Following discussions, simulated run-throughs of the examination and allowing for unforeseen circumstances it was decided that approximately 40 students per day could be examined over 4 days. Students and examiners were divided into 6 "pods" per day, each facilitated on Zoom by one member of academic staff.

At the student's allocated examination time, they were admitted to a Zoom "Breakout Room" where their examiners were waiting. Each student was assessed in two scenarios by two examiners. In the course of the first scenario, the student demonstrated their history-taking skills by obtaining a focussed history from one of the examiners. Their ability to assimilate the important points from the encounter was assessed by requiring them to summarise the history. Based on the information they had obtained, the student was asked to formulate and prioritise a list of differential diagnoses, with justification for their decisions.

A second examiner chose a different scenario to assess the student's knowledge of clinical examination. They were asked to describe how they would examine a child based on this scenario. This included detail of various examination skills, paediatric-specific adjustments to examination technique and relevant clinical signs which they might expect to see. Skills in devising suitable investigation and management plans based on the clinical scenario were also examined. Patient-counselling skills were evaluated by asking the student to explain the diagnosis, investigation or management plan in child and family-friendly language. This required the student to have knowledge of a broad range of paediatric topics while at the same time assessing their communication skills. Professionalism was assessed throughout the encounter. Examiners consulted with each other to agree on the student's mark using a detailed rubric. Written feedback was recorded for each student. At the end of each day, an examiners' meeting was held, where each student's results were discussed, and any issues were resolved.

This meeting provided an opportunity to view the student's examination result in the context of their previous written assessments and to gather informal feedback from examiners on the format of the examination.

Retrospective analyses of examination results were performed using GraphPad Prism (GraphPad Software, Inc, California). Correlations between a student's various grades were calculated with Pearson's correlation coefficient. There was a significant correlation between a student's performance in the online clinical examination and the CDIE ( $r=0.3935$ ; 95% CI=0.2595-0.5126;  $p,0.0001$ ), MCQ ( $r=0.4055$ , 95% CI=0.2729-0.5231;  $p,0.0001$ ) and overall marks in their summative assessment ( $r=0.7268$ ; 95% CI=0.6479 to 0.7903;  $p<0.0001$ ).

Advantages of this method included the ability to ensure social distancing, a rapid turn-around time between students, lack of reliance on patient attendance for examination, and reduced variability between the cases presented to students. The main disadvantages of this system were the inability to directly assess the development of psychomotor skills required for clinical examination and the students' ability to adapt their examination to the particular needs of a given child. In conclusion, in the absence of the ability to carry out a traditional clinical examination, this method appears to be an acceptable alternative.

**Declaration of Conflicts of Interest:**

The authors declare they have no conflicts of interest.

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