

## QUALITY AND PATIENT SAFETY

# Can I leave the theatre? A key to more reliable workplace-based assessment

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### Editor's key points

- Existing tools for work-based clinical assessment have been limited by low reliability and capability to identify poorly performing individuals.
- This paper evaluated a new scoring system for clinical assessment of trainees.
- This system combined traditional assessments with the addition of case difficulty and the level of supervision required.
- This new scoring system appears reliable, with better detection of poor performance.

**Background.** The value of workplace-based assessments such as the mini-clinical evaluation exercise (mini-CEX), and clinicians' confidence and engagement in the process, has been constrained by low reliability and limited capacity to identify underperforming trainees. We proposed that changing the way supervisors make judgements about trainees would improve score reliability and identification of underperformers. Anaesthetists regularly make decisions about the level of trainee independence with a case, based on how closely they need to supervise them. We therefore used this as the basis for a new scoring system.

**Methods.** We analysed 338 mini-CEXs where supervisors scored trainees using the conventional system, and also scored trainee independence, based on the need for direct, or more distant, supervision. As supervisory requirements depend on case difficulty, we then compared the actual trainee independence score and the expected trainee independence score obtained externally.

**Results.** Compared with the conventional scoring system used in previous studies, reliability was very substantially improved using a system based on a trainee's level of independence with a case. Reliability improved further when this score was corrected for case difficulty. Furthermore, the new scoring system overcame the previously identified problem of assessor leniency and identified a number of trainees performing below expectations.

**Conclusions.** Supervisors' judgements on trainee independence with a case, based on the need for direct or more distant supervision, can generate reliable scores of trainee ability without the need for an onerous number of assessments, identify trainees performing below expectations, and track trainee progress towards independent specialist practice.

**Keywords:** educational assessment; educational measurement; medical education, graduate; reliability; workplace

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Anaesthesia training programmes aim to produce graduates capable of independent specialist practice. Traditional assessments have emphasized knowledge acquisition, rather than clinical ability, and workplace-based assessments (WBAs) have been introduced across many postgraduate and undergraduate programmes to address this. WBAs are now a compulsory component of many specialist training programmes,<sup>1</sup> many using modifications of Norcini's mini-clinical evaluation

exercise<sup>2</sup> (mini-CEX). The Royal College of Anaesthetists' (RCA) 'Anaesthesia Clinical Evaluation Exercise' (A-CEX) is an example.<sup>3</sup>

Reliability and validity are of central importance in any assessment, including WBAs. While anaesthesia fellowship examinations are valid and reliable tests of knowledge, they may not be a good measure of the ability to practice as an anaesthetist. While WBAs should be a more valid measure of

this ability, previous studies suggest they have low reliability, and fail to identify the struggling trainee whom experienced clinicians have no difficulty recognizing.<sup>4, 5</sup>

In comparison with formal examinations, a number of factors affect the reliability of WBAs. Formal examinations can be standardized for difficulty and content, but WBAs cannot—cases are unpredictable and cannot be scheduled or repeated. The examiners in formal anaesthesia examinations are trained, and agree on set standards of performance, but the ‘examiners’ in WBAs can include all specialist anaesthetists working in teaching hospitals, many of whom have limited training in the use of the WBA tools.

In our previous study of the mini-CEX (modified for anaesthesia), more than 60 assessments were required to reach a level of reliability sufficient to make defensible decisions on trainee progression. Moreover, no trainee received an unsatisfactory grade in any of the 331 assessments we studied.<sup>4</sup> While interviews with trainees and supervisors strongly supported the value of mini-CEX to improve supervision and feedback, we found many anaesthetic supervisors lacked confidence in their ability to judge trainees against a scoring system that used the term ‘expected level of performance’, and were also reluctant to tell a trainee their performance was unsatisfactory.<sup>5</sup> WBAs depend on willing supervisors, but where WBAs are seen as unreliable, supervisors will disengage from the exercise, and decisions on trainee progression made on the basis of unreliable assessments will be open to challenge.

Data from studies of the way experts make judgements in complex settings, including medical ones,<sup>6, 7</sup> suggest that a scoring system reflecting the way clinicians usually make judgements about trainees would reduce disagreement between them, and increase score precision. Anaesthesia supervisors are accustomed to judging the need for direct, indirect, or more distant supervision required by a trainee managing a particular case. We therefore developed a scoring system based on the extent to which the supervisor trusted the trainee to independently manage a case, with descriptors reflecting the need for close or more distant supervision (e.g. going to the theatre tearoom, the hospital cafeteria, being out of the hospital). We called this the ‘trainee independence score’. To overcome the observed reluctance of supervisors to award scores of unsatisfactory or below standard,<sup>5</sup> we used non-pejorative descriptors, that is, the amount of supervision required.

Our primary hypothesis was that supervisors’ scores would be more reliable when scoring trainee independence with the case than when using the conventional system scoring trainees below, at, or above expectations for stage of training.

The extent to which a trainee can independently manage a case depends on two factors—the ability of the trainee and case difficulty. Correcting for the latter required an external standard stating the extent to which the trainee should be able to manage independently a particular type of case at their stage of training, or from the supervisor’s perspective, the need for direct, indirect, or distant supervision for such a case. Comparing the expected supervisory requirements with the actual supervisory requirements for a particular case allows calculation of the ‘corrected trainee independence’ score.

Our secondary hypotheses were: that the corrected trainee independence score would be more reliable than the (uncorrected) trainee independence score; and that the corrected independence score would identify more trainees performing below expectations than the conventional system.

## Methods

The National Multi-region Ethics Committee considered the project fell under the category of quality assurance, where we were evaluating a development within an existing programme of assessment and ethics approval was not required. To ensure confidentiality, all trainee, case, and assessor data were de-identified on submission to the centralized database.

### The context

This study took place in the anaesthetic departments of three major teaching hospitals, two in New Zealand and one in Australia before the introduction of compulsory mini-CEX assessments for the Australian and New Zealand College of Anaesthetists (ANZCA) training programme in 2013. The ANZCA training programme requires progression through five levels (basic trainee year 1–2, advanced trainee year 1–3).

### The online mini-CEX form

We changed the scoring systems in the original version of our online mini-CEX form to address the identified issues of assessor variability and leniency.<sup>4, 5</sup> We asked anaesthesia supervisors to rate the following: each of the 10 domains of practice against a scoring system of developing autonomy; overall level of independence with the case; and overall performance against that expected for stage of training. We used a nine-point scale for all scoring systems, divided into three categories, with three points in each category, each with descriptors. A word version of the online mini-CEX form used in this study is shown, with descriptors, in the Appendix.

### Participants

Assessments were voluntary and all trainees and all supervisors in the three departments at the time of the study were eligible to submit assessments. Mini-CEX assessment data were submitted online in real time to a single database.

### Sample size

We aimed to collect a minimum of 300 assessments, including a large and representative sample of trainees and supervisors from across the regions. Each of these factors is important for the precision and generalizability of the reliability estimates.<sup>8</sup>

### Generating scores for expected level of independence for the case

We convened a panel of three experienced supervisors of training (SOTs). SOTs are appropriately trained specialist anaesthetists, officially appointed by ANZCA and responsible for training in ANZCA-accredited departments. They oversee each trainee’s clinical performance and WBAs, perform regular clinical placement reviews, and confirm progression of trainees through the training programme. We provided the three SOTs

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