

Making robust assessments of specialist trainees' workplace performance

J. M. Weller^{1,2,*}, D. J. Castanelli^{3,4}, Y. Chen¹ and B. Jolly⁵

¹Centre for Medical and Health Sciences Education, School of Medicine, University of Auckland, New Zealand, ²Department of Anaesthesia, Auckland City Hospital, New Zealand, ³Department of Anaesthesia and Perioperative Medicine, Monash Health, Victoria, Australia, ⁴Department of Anaesthesia and Perioperative Medicine, Monash University, Clayton, Victoria, Australia and ⁵Medical Education Unit, School of Medicine and Public Health, Faculty of Health and Medicine, University of Newcastle, New South Wales, Australia

*Corresponding author. E-mail: j.weller@auckland.ac.nz

Abstract

Background. Workplace-based assessments should provide a reliable measure of trainee performance, but have met with mixed success. We proposed that using an entrustability scale, where supervisors scored trainees on the level of supervision required for the case would improve the utility of compulsory mini-clinical evaluation exercise (CEX) assessments in a large anaesthesia training program.

Methods. We analysed mini-CEX scores from all Australian and New Zealand College of Anaesthetists trainees submitted to an online database over a 12-month period. Supervisors' scores were adjusted for the expected supervision requirement for the case for trainees at different stages of training. We used generalisability theory to determine score reliability.

Results. 7808 assessments were available for analysis. Supervision requirements decreased significantly ($P < 0.05$) with increased duration and level of training, supporting validity. We found moderate reliability ($G > 0.7$) with a feasible number of assessments. Adjusting scores against the expected supervision requirement considerably improved reliability, with $G > 0.8$ achieved with only nine assessments. Three per cent of trainees generated average mini-CEX scores below the expected standard.

Conclusions. Using an entrustment scoring system, where supervisors score trainees on the level of supervision required, mini-CEX scores demonstrated moderate reliability within a feasible number of assessments, and evidence of validity. When scores were adjusted against an expected standard, underperforming trainees could be identified, and reliability much improved. Taken together with other evidence on trainee ability, the mini-CEX is of sufficient reliability for inclusion in high stakes decisions on trainee progression towards independent specialist practice.

Key words: educational assessment; educational measurement; medical education, graduate; reliability; workplace

The move to competency-based medical education demands some measure of a trainee's ability to work independently and provide safe, effective and efficient care.^{1,2} Workplace-based assessments (WBAs) have been introduced widely in specialist training programs, after the description of the mini-clinical

evaluation exercise (mini-CEX) by Norcini in 1995 to partly address this need.³ A further potential benefit of WBAs is that when supervisors stand back and observe trainees, and use a structured format for feedback, the quality of the feedback improves.⁴⁻⁸

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Editor's Key Points

- Structured, formal evaluations are becoming embedded throughout medical specialist training.
- An entrustment process occurs in which an expert supervisor fosters growing independence of practice, but objective measures are needed.
- This study found that mini-clinical evaluation exercise assessments are valid, reliable and can identify underperformers.
- These findings from Australia and New Zealand need confirmation in other settings.

However, WBA implementation has met with mixed fortune. At worst, WBAs have been described as an unreliable tick box exercise in compliance, an unhelpful administrative hurdle, and of little value to trainees or supervisors.^{9 10} Because of perceived lack of value in formal assessment decisions, and the potential negative effect on feedback if perceived as summative, some institutions have moved to a formative-only stance on WBA.¹¹ We consider this is not utilizing WBA to its full potential.

The anaesthesia curriculum can be described in terms of the work that needs to be done, and entrustment decisions made on areas of work that can be safely entrusted to the trainee. These areas of work have been called Entrustable Professional Activities.¹² Clinical supervisors habitually make judgements on the extent to which they can leave the care of their cases in the hands of a trainee. Entrustment scales have been proposed as a way of capturing this expert judgement in WBA¹³ and improving the reliability of clinical supervisor ratings. Changing the WBA scoring system to reflect this entrustment decision could generate reliable assessments, that could indeed be used to make defensible decisions on trainees' ability to progress through the training scheme to independent practice.^{8 14 15}

This study represents the third phase of a program of research on the mini-CEX in the Australian and New Zealand College of Anaesthetists (ANZCA) training program. In our context, the mini-CEX comprises an holistic assessment of a trainee's performance over an entire case from planning and preparation through case management, and including communication, team collaboration and risk minimisation. In our first study¹⁶ supervisors were asked to make judgements on trainees on a scale of unsatisfactory, satisfactory or superior performance. While the quality of supervision and feedback improved, we estimated over 50 assessments would be required to generate a reliable score for any trainee, and we did not identify any trainee whose performance was classified as unsatisfactory.^{7 16} In our second study¹⁵ supervisors were asked to judge how closely they needed to supervise the trainee for the case (i.e. from within the theatre suite, or hospital, or from an offsite location). This led to markedly improved reliability estimates. In addition, when scores were adjusted against an independently derived standard for the expected level of performance with that case a reliable estimate of trainee ability would be obtained with as few as ten mini-CEX assessments. In addition, a substantial group of trainees was identified who performed below the expected standard,¹⁵ a capacity of the mini-CEX that we had previously identified as lacking.

In 2013, ANZCA introduced a raft of compulsory workplace-based assessments, including mini-CEX, for all anaesthesia trainees in Australia and New Zealand, using our previously

tested scale based on supervision requirement (SReq) (BOX 1). We were unsure if the very positive results from our small studies involving volunteer trainees and supervisors would translate to the real world of ANZCA training, with around 1500 trainees, over 4000 potential supervisors, and compulsory mini-CEX assessments.

In this study we explored reliability and validity of the mini-CEX assessments using all such assessments submitted to the Trainee Portfolio System (TPS). As in our previous study, we were also interested in the reliability of the scores for SReq adjusted against an external standard for expected SReq (i.e. with a specific case did the trainee require more or less supervision than expected for their training level).

Our specific research questions (with the evidence they would supply) were:

1. Are mini-CEX scores for SReq strongly related to level of training? (Evidence of construct validity)
2. What is the reliability of the mini-CEX scores for SReq? (Evidence of reliability)
3. What is the reliability of the score for the observed Mini-CEX SReq when adjusted for expected SReqs for that case (Evidence on how variation from a standard might be more useful than a simple score)
4. Can we use mini-CEX scores to identify the underperforming trainee? (Evidence that, contrary to some studies' findings, WBA can detect underperformance reliably)

Methods

Ethics and consent

Ethics approval was obtained from the University of Auckland Human Participant Ethics Committee (Ref. 011108) and the Monash University Human Research Ethics Committee (CF14/1668 – 2014000796). ANZCA trainees sign a training agreement in which they consent to their training records being accessed by those with appropriate authority and to the use of de-identified TPS data for the purpose of monitoring and evaluation. Access to the Trainee Portfolio System data was through ANZCA staff and all data provided to the research team for analysis was encrypted such that no individual trainee or supervisor could be identified.

Context

The ANZCA Training Program: The ANZCA training program comprises four distinct stages which are completed in a minimum of five yr. These stages are: Introductory Training (IT), zero to six months, where trainees are under direct supervision and must pass the Initial Assessment of Anaesthetic Competence; Basic Training (BT), a further 18 months, during which trainees may undertake some work under indirect supervision, participate in the after-hours roster, and must pass the FANZCA Part 1 Exam; Advanced Trainee (AT), of two yr duration, during which time trainees must pass the FANZCA Part 2 Exam; and Provisional Fellowship Trainee (PFT) of one yr duration, where trainees may undertake a subspecialty fellowship and prepare for independent practice. Trainees enter extended training (IT-E, BT-E, AT-E, PFT-E) when they fail to complete the requirements for that stage. In addition to time and formal assessments, these requirements include specified volumes of practice, research, teaching and audit activities, and a minimum number of WBAs submitted to the TPS. These WBAs comprise Direct Observation of Procedural Skills (DOPS), case-based

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