SPECIAL ARTICLE

Mini-CEX: A Method Integrating Direct Observation and Constructive Feedback for Assessing Professional Performance

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SUMMARY

The mini-CEX (mini clinical evaluation exercise) is a tool for the assessment of professional performance of residents through direct observation of resident-patient encounter, evaluating clinical skills and providing subsequent feedback in the work setting. The exam focuses on the evaluation of resident's skills during resident-patient encounter. The evaluator must document resident's performance in six areas of competence. The exam is easy to apply as it fits in real life settings in the different clinical scenarios. The evaluation should not take more than 20 minutes and each resident should have 8 mini-CEX per year of training with different faculties.
Faculties should previously define the areas of competence to evaluate and the minimum performance standards residents should reach. All the completed forms should be used to construct a database in order to monitor the evaluation process and make the necessary corrections.

Rev Argent Cardiol 2011;79:531-536

Key words > Mini-CEX - Direct Observation - Constructive Feedback - Residents - Evaluation

BACKGROUND

The mini clinical evaluation exercise (mini-CEX) is a valuable tool to evaluate clinical performance. It requires direct observation of a resident engaged in a clinical encounter, rating of performance in a set of competencies, and a feedback session immediately afterwards.

Before going into the details of the instrument, we will discuss the three components of the mini-CEX: clinical performance, direct observation, and feedback.

Clinical performance

Competent clinical performance is defined as the degree to which individuals can use their knowledge, skills and attitudes in an integrative way to successfully carry out complex professional tasks in their daily practice (1).

Clinical performance is multidimensional, that is, during patient encounters doctors need to integrate and perform different task components, such as communication and physical examination.

Because competent clinical performance is highly context dependent, competence demonstrated in one particular case scenario (for example: in the coronary care unit) does not automatically guarantee successful performance in another scenario. This is known as the problem of the content specificity of clinical performance. It implies that if one wishes to infer general conclusions about a resident's competencies, one needs to conduct assessments across many different contexts, settings, and cases.

Miller's simple conceptual model of clinical performance (figure 1) clearly illustrates what medical educators can measure in terms of assessment (2). Miller conceives of competence as a pyramid. The base of the pyramid consists of factual knowledge. One one level up, the ability to use knowledge as 'know-how' in a particular context comes close to clinical reasoning and problem solving. Higher still, the 'shows how' level reflects the ability to act appropriately in a practical situation and describes hands-on behavior in simulated practice situations. Finally, the 'does' level refers to authentic performance in day-to-day practice. The higher in the pyramid competence is to be assessed, the more clinically authentic the assessment needs to be. If examiners wish to assess residents' performance at the highest level of Miller's pyramid, they need to evaluate habitual performance in everyday practice (3).

Direct observation

Assessment of clinical competencies based on direct

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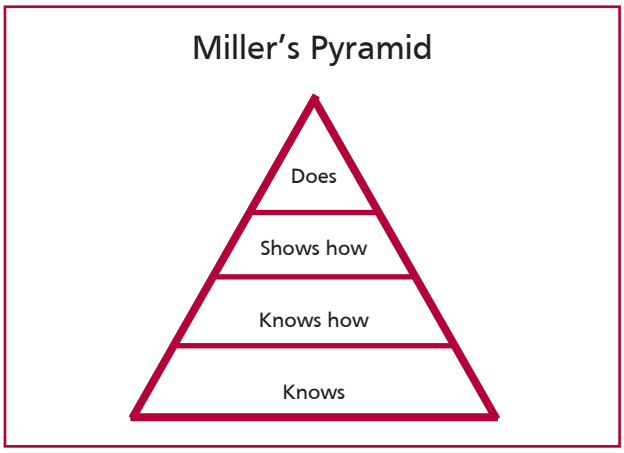
Fig. 1. Miller's Pyramid



observation of a resident interacting with a patient constitutes a tool of inestimable learning value. Regular direct observation facilitates longitudinal follow-up of a resident's progress on the one hand while on the other hand allowing 'in situ' and 'in vivo' correction and reinforcement of a resident's actions and attitudes (4-5).

The clinical supervisor gathers and records information about the observed situation, usually by means of a checklist or rating scale. Unfortunately, this occurs infrequently and inadequately. End of rotation global rating forms are often completed by supervisors who have not directly observed the resident in encounters with patients. Nonetheless, assessment based on direct observation is an essential component of outcomes based education and certification.

Constructive feedback

Constructive feedback is defined as the act of giving information to a resident by describing their performance in an observed clinical situation. The elements required for improving performance through feedback are: observation of an event, appraisal of the event according to a standard, and recommendations for improvement (5). The impact of feedback is optimized when residents compare their teacher's feedback with their self-assessment of the same performance. Dissonance between desired and actual performance constitutes a strong motivation and incentive for deep learning. The purpose of constructive feedback is to provide guidance and advice on how to enhance future performance in line with desired objectives (6-8).

HISTORY OF THE MINI-CEX

In 1972, the American Board of Internal Medicine (ABIM) adopted the Clinical Evaluation Exercise (CEX). The CEX consists of a bedside oral exam and is widely used in postgraduate training programs for end-of-year assessments or upon finalization of the residency. (9). The CEX, in its traditional format, is conducted by a clinical supervisor who observes a resident during a patient interview, physical examination and presentation of the findings and proposed diagnostic-therapeutic strategy. At the end of the CEX the clinical supervisor provides feedback on the resident's performance. The whole exercise takes two hours. As an assessment method, the traditional CEX presents three major problems. First, the resident is evaluated by a single clinical supervisor, which is questionable given the known dissonance among observers (10-13). Second, the assessment is based on one single patient encounter. From the content specificity problem we know that performance on one case is unlikely to predict performance on other cases and therefore not generalizable to other patients (9). Third, a single long case takes up too much time, which reduces feasibility.

What is the mini-CEX?

The mini-Clinical Evaluation Exercise (mini-CEX) focuses on the core skills that residents should demonstrate during patient encounters and requires teachers to document a resident's performance in six general competencies. The mini-CEX is easy to use by clinical supervisors, because it fits seamlessly in the daily routine of any clinical setting. Estimated time of the interaction does not exceed 15-20 minutes, and a resident should annually receive at least eight evaluations from different clinical supervisors. One single clinical supervisor observes and evaluates a resident taking a focused history and performing a physical examination. After the resident has presented the diagnostic and treatment plan, the clinical supervisor completes a short evaluation form and gives feedback to the resident. As the encounter is relatively short and takes place as a natural part of routine practice within the training environment, it is quite feasible to have different supervisors evaluate residents on different cases and on different occasions during the course of the residency program. On the nine-point rating scale that is used, four is formally classified as satisfactory, but actually it denotes 'marginal' performance indicating that the resident needs to improve his or her performance by engaging in recommended remediation to ensure that the requirements for board certification can be met.

The competencies that can be evaluated using the mini-CEX are defined as follows:

- Medical Interviewing Skills: Facilitates the patient's story-telling through effective use of questions/directions in order to obtain accurate and required information; responds appropriately to affect and non-verbal cues.
- Physical Examination Skills: Shows efficiency and a logical sequence; balances screening/diagnostic steps towards problem; informs the patient and is sensitive to the patient's comfort and modesty.
- Humanistic Qualities/ Professionalism: Shows respect, compassion, empathy, establishes trust; attends to the patient's needs for comfort, modesty,

confidentiality and information.
- Clinical Judgment: Selectively orders/performs appropriate diagnostic investigations/tests, considers risks and benefits.
- Counseling Skills: Explains rationale for tests/ treatment, obtains patient's consent, educates/ counsels patient on the proposed management.
- Organization/ Efficiency Skills: Prioritizes actions; uses time efficiently; is succinct.
- Overall Clinical Competence: Demonstrates judgment, synthesis, caring, effectiveness, efficiency.

Performance is rated on a nine-point scale where 1, 2 and 3 indicate unsatisfactory performance, 4 marginal performance, 5 and 6 satisfactory performance, and 7, 8 and 9 superior performance. In addition to the data on a resident's performance, the clinical supervisor records information about the setting of the assessment, such as the inpatient service, the outpatient clinic or the emergency department, the complexity of the case (low, moderate, high), and the patient's gender, age and major medical problems and diagnoses (Appendix 1).

Psychometric Characteristics

The usefulness of an assessment tool is directly proportional to its validity, reproducibility, educational impact, and acceptability to teachers and inversely proportional to the related costs. Several studies have demonstrated that the mini-CEX is a valid tool with acceptable reliability with a minimum of eight assessments per year by different observers; it has a favorable educational impact and satisfactory acceptance by clinical supervisors and residents (10, 14-17).

Implementation Strategies

If an assessment instrument is to survive, it must be accepted and actively used by clinical supervisors and residents. This is particularly true for work-based assessment where the value of the assessment seems to depend more strongly on the users of the instrument than on the instrument itself (18). Descriptions of competencies should be discussed and agreed upon by different observers prior to the introduction of the instrument. As for the introduction of the mini-CEX in a residency program, it is essential that directors and clinical supervisors determine specific guidelines and performance standards for each level of training, thereby facilitating longitudinal assessment of individual residents.

This is particularly important when the mini-CEX is used for pass/fail decisions. Many clinical supervisors are reluctant to fail residents even if their performance is clearly unsatisfactory. An as yet unpublished qualitative study, carried out among seventeen evaluators of the Instituto Cardiovascular de Buenos Aires, showed that the evaluators thought they were too inadequately informed and ill prepared to be able to assess all competencies. This was particularly true for borderline performance and resulted in difficulties in making pass/fail decisions. Interpersonal and institutional relationships constituted another barrier to failing residents.

The following description typically illustrates the assessment process after the implementation of the mini-CEX: the resident asks the clinical supervisor to observe his or her next patient encounter or the clinical supervisor coordinates with the resident to set a time and place for an observed patient encounter (19). This procedure is repeated with different observers several times during one year. A third option is for assessments to be scheduled by an administrator, for example as one slot in the outpatient surgery. It is advisable to design pocket-size rating forms or to have forms readily available at strategic places in settings where observations are frequently conducted. Once the observation is carried out, the teacher completes the form and delivers instant verbal feedback to the resident. (Table 1)

Apart from data enabling assessment of a resident's performance on various competencies, the mini-CEX form allows compilation of additional data like the patient's problem, the setting of the observation (ambulatory setting, emergency room, coronary care unit, others), the patient's age and gender, and the complexity of the case. An investigation by the Argentine Society of Cardiology among 108 residents and 253 mini-CEX encounters showed that: the most frequently observed patient problems were acute coronary syndromes, acute cardiac insufficiency and post-cardiac surgery; 80% of the assessments were carried out in the coronary care unit and in-patient settings; complexity was high or moderate in more than 90% of the encounters. It has been demonstrated that assessment drives residents´ learning style (16). If we measure residents' performance on the basis of acute patients and patients with critical conditions, we run the risk of training physicians whose main expertise is in dealing with patient problems with high complexity but low prevalence.

Table 1. Implementation strategies

1	Analyze with teachers involved each of the competencies to assess
2	Identify what is important to observe
3	Agree on minimum requirements for each resident according to level of expertise/experience
4	Distribute the forms throughout the different observation scenarios or design pocket forms
5	Schedule the session with the resident. The resident may also request the teacher to be observed
6	Observe performance
7	Complete the form
8	Deliver immediate feedback

CONCLUSION

The mini-CEX is a valid and reliable instrument to evaluate clinical competencies provided it is used appropriately. It promotes direct observation and constructive feedback on real patient encounters in the clinical workplace. It is used widely in various countries around the world to evaluate professional performance, in particular during residency training, and it is generally well accepted by both clinical supervisors and residents. It is used especially as a formative assessment tool, but its psychometric properties indicate that it is also suitable for summative purposes (provided the sampling of encounters and observers is sufficiently large). It is of vital importance that clinical supervisors determine in advance which competencies are to be evaluated and which performance standards are to be met by the residents. Setting up a database with information obtained from completed assessment forms will enable us to monitor the evaluation process and take any corrective measures that are deemed necessary.

RESUMEN

Mini-CEX: una herramienta que integra la observación directa y la devolución constructiva para la evaluación del desempeño profesional

El mini-CEX (mini clinical evaluation exercise) es un instrumento de evaluación del desempeño profesional a través de la observación directa del residente mientras participa de un encuentro con un paciente, la valoración de una serie de habilidades y destrezas clínicas con posterior provisión de feedback o devolución en su ámbito de trabajo. Se centra en una serie de habilidades que el residente debe demostrar durante el encuentro con un paciente y requiere que el docente documente ese desempeño en seis competencias. Es fácil de aplicar por los docentes porque se integra bien a la rutina del día a día en los diferentes escenarios clínicos. El tiempo estimado de esta interacción no debe superar los 20 minutos y debe repetirse al menos 8 veces al año con cada residente por diferentes docentes.

Es de vital importancia que los docentes definan de antemano qué competencias se van a evaluar y cuáles son los estándares de desempeño mínimo que deberán alcanzar los residentes.

La confección de una base de datos con la información de los formularios completados nos permitirá monitorizar el proceso de evaluación y efectuar las medidas correctivas pertinentes.

Palabras clave > Mini-CEX - Observación directa - Devolución constructiva - Feedback - Residentes - Evaluación

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APPENDIX 1
The Mini-CEX form

Evaluator: _____ Date: _____
Fellow: _____ ○ F-1 ○ F-2 ○ F-3
Patient Problem/Dx: _____

Setting: ○ Ambulatory ○ In-patient ○ ED ○ Other

Patient: Age: _____ Sex: _____ ○ New ○ Follow-up

Complexity: ○ Low ○ Moderate ○ High

Focus: ○ Data gathering ○ Diagnosis ○ Therapy ○ Counselling

1. Medical interviewing skills: (not observed)

1 2 3 Unsatisfactory	4 5 6 Satisfactory	7 8 9 Superior

2. Physical examination skills: (not observed)

1 2 3 Unsatisfactory	4 5 6 Satisfactory	7 8 9 Superior

3. Humanistic qualities / professionalism: (not observed)

1 2 3 Unsatisfactory	4 5 6 Satisfactory	7 8 9 Superior

4. Clinical judgment: (not observed)

1 2 3 Unsatisfactory	4 5 6 Satisfactory	7 8 9 Superior

5. Counselling skills: (not observed)

1 2 3 Unsatisfactory	4 5 6 Satisfactory	7 8 9 Superior

6. Organization / efficiency: (not observed)

1 2 3 Unsatisfactory	4 5 6 Satisfactory	7 8 9 Superior

7. Overall clinical competence: (not observed)

1 2 3 Unsatisfactory	4 5 6 Satisfactory	7 8 9 Superior

Mini-CEX time: Observing: Min Providing feedback: Min

Evaluator satisfaction with mini-CEX: Low 1 2 3 4 5 6 7 8 9 High

Fellow´s satisfaction with mini-CEX: Low 1 2 3 4 5 6 7 8 9 High

Comments: _____

Fellow signature Evaluator signature

Dx = diagnosis; ED = emergency department; min = minutes; F1 = first year fellow; F2 = second year fellow; F1 = third year fellow;