

SUPPLEMENTARY STATISTICS

Table A. Summary of descriptive statistics of items/scores for all data sets

| | | Data | | | | | |
|---|--|-------------|-------------|-------------|-------------|---------------|-------------|
| | | EFA (n=244) | | CFA (n=274) | | Total (n=518) | |
| | | Mean | SD | Mean | SD | Mean | SD |
| Subscale 1: Knowledge and learning materials | | 1.88 | 0.85 | 1.88 | 0.81 | 1.88 | 0.83 |
| Item14 | I know how to calculate Number Needed to Treat when reviewing an article. | 1.61 | 1.08 | 1.58 | 1.10 | 1.60 | 1.09 |
| Item23 | Sufficient learning material is available on how to review the literature. | 2.09 | 1.11 | 2.19 | 1.11 | 2.14 | 1.11 |
| Item26 | I know how to calculate Relative Risk Reduction when reviewing an article. | 1.66 | 1.09 | 1.72 | 1.13 | 1.69 | 1.11 |
| Item31 | Sufficient learning material is available on how to critique articles. | 1.98 | 1.04 | 2.06 | 1.04 | 2.03 | 1.04 |
| Item38 | I know how to calculate Absolute Risk Reduction when reviewing an article. | 1.63 | 1.06 | 1.60 | 1.08 | 1.61 | 1.07 |
| Item40 | Sufficient learning material is available on how to ask a clinical question. | 2.22 | 0.99 | 2.22 | 1.03 | 2.22 | 1.01 |
| Item53 | I know how to calculate Relative Risk when reviewing an article. | 1.91 | 1.10 | 1.91 | 1.12 | 1.91 | 1.11 |
| Item65 | I know how to calculate Odds Ratio when reviewing an article. | 1.89 | 1.17 | 1.75 | 1.22 | 1.82 | 1.19 |
| Subscale 2: Learner support | | 2.38 | 0.77 | 2.37 | 0.76 | 2.37 | 0.76 |
| Item10 | Faculty / The consultants set clear expectations about how my review of evidence should support my clinical decisions. | 2.28 | 1.02 | 2.24 | 1.06 | 2.26 | 1.04 |
| Item15 | I am given time to participate in educational activities related to EBM. | 1.93 | 1.20 | 2.05 | 1.15 | 1.99 | 1.17 |
| Item28 | Residents / Registrars are adequately supervised for their application of EBM in their clinical care. | 1.95 | 1.08 | 1.99 | 1.10 | 1.97 | 1.09 |
| Item30 | I have the opportunity to apply evidence-based principles in my clinical care. | 3.11 | 0.85 | 3.01 | 0.86 | 3.06 | 0.86 |
| Item33 | Faculty / The consultants are enthusiastic about teaching me EBM. | 2.61 | 1.04 | 2.57 | 1.10 | 2.59 | 1.07 |
| Item42 | Faculty / My mentor(s) provided me with internet EBM resources. | 2.41 | 1.21 | 2.38 | 1.18 | 2.39 | 1.19 |
| Item48 | Faculty / The consultants serve as role models for using EBM in clinical practice. | 2.32 | 1.03 | 2.27 | 1.04 | 2.29 | 1.04 |
| Item50 | There are good channels of communication in the hospital(s) and clinic(s) in which I work. | 2.41 | 1.13 | 2.36 | 1.05 | 2.39 | 1.09 |
| Item55 | I have on-line access to the most important EBM sources. | 2.48 | 1.11 | 2.46 | 1.15 | 2.47 | 1.13 |
| Item58 | Faculty / The consultants help me to increase my competence in EBM. | 2.24 | 0.97 | 2.34 | 0.97 | 2.29 | 0.98 |

| | | Data | | | | | |
|--------|---|-------------|-------------|-------------|-------------|---------------|-------------|
| | | EFA (n=244) | | CFA (n=274) | | Total (n=518) | |
| | | Mean | SD | Mean | SD | Mean | SD |
| | Subscale 3: General relationships and support | 2.75 | 0.59 | 2.75 | 0.62 | 2.75 | 0.60 |
| Item02 | Consultants are easily available for assistance in any of the steps required for critical appraisal. | 2.48 | 0.91 | 2.57 | 0.92 | 2.53 | 0.92 |
| Item09 | Faculty / The consultants are approachable and friendly. | 3.10 | 0.78 | 3.12 | 0.85 | 3.11 | 0.82 |
| Item17 | There are good channels of communication in my department. | 2.55 | 1.03 | 2.50 | 1.01 | 2.52 | 1.02 |
| Item21 | I am able to ask "why?" with regard to clinical practice issues to faculty / consultants. | 2.81 | 0.83 | 2.75 | 0.95 | 2.78 | 0.90 |
| Item43 | I have good rapport with faculty / the consultants. | 3.05 | 0.72 | 3.02 | 0.82 | 3.04 | 0.77 |
| Item45 | I feel comfortable in my program. | 2.61 | 0.86 | 2.64 | 0.85 | 2.63 | 0.85 |
| Item54 | Working here, I feel part of a team. | 2.91 | 0.89 | 2.90 | 0.89 | 2.91 | 0.89 |
| Item60 | My views are respected by faculty / consultants. | 2.50 | 0.80 | 2.54 | 0.83 | 2.52 | 0.81 |
| | | | | | | | |
| | Subscale 4: Institutional focus on EBM | 2.49 | 0.67 | 2.51 | 0.71 | 2.50 | 0.69 |
| Item01 | Feedback from review of practice or from morbidity and mortality conferences is used to change practice in my department. | 2.49 | 0.94 | 2.59 | 0.92 | 2.54 | 0.93 |
| Item18 | Evidence-based medicine gets sufficient attention in my department. | 2.33 | 1.01 | 2.39 | 1.06 | 2.36 | 1.04 |
| Item20 | Faculty / The head of department / head of the firm conducts "evidence-based" ward rounds with residents /registrars. | 2.17 | 1.10 | 2.21 | 1.12 | 2.19 | 1.11 |
| Item24 | Faculty / The consultants are willing to challenge, question, and explore. | 2.69 | 0.95 | 2.69 | 0.90 | 2.69 | 0.92 |
| Item27 | Faculty / The consultants address clinical questions through a formal review of the evidence. | 2.37 | 0.91 | 2.31 | 0.92 | 2.34 | 0.91 |
| Item29 | Case discussions in my hospital / unit / department emphasize critical appraisal of articles. | 2.59 | 0.93 | 2.66 | 0.98 | 2.63 | 0.96 |
| Item34 | Using EBM is a routine practice in my institution. | 2.16 | 1.01 | 2.19 | 1.10 | 2.18 | 1.06 |
| Item36 | I have access to evidence-based clinical advice from the consultants. | 2.54 | 0.92 | 2.57 | 0.91 | 2.56 | 0.91 |
| Item41 | Best practices that are communicated in my institution are normally implemented. | 2.73 | 0.80 | 2.70 | 0.83 | 2.71 | 0.82 |
| Item47 | Faculty / The consultants routinely review evidence in morbidity and mortality conferences and in case discussions. | 2.50 | 1.00 | 2.57 | 1.08 | 2.54 | 1.05 |
| Item49 | Senior faculty / Consultants in my department listen when someone brings evidence that should lead to change of practice. | 2.70 | 0.91 | 2.75 | 0.94 | 2.73 | 0.92 |
| Item51 | Reviews of practice are done routinely in my department to improve the quality of care. | 2.55 | 0.94 | 2.45 | 1.03 | 2.49 | 0.99 |
| Item63 | The evidence from Cochrane Systematic Reviews is used in my department to develop new clinical practice guidelines. | 2.41 | 1.04 | 2.41 | 1.07 | 2.41 | 1.05 |
| Item67 | Faculty / The consultants usually use EBM principles when considering treatment for patients. | 2.60 | 0.90 | 2.57 | 0.99 | 2.59 | 0.95 |

| | | Data | | | | | |
|--------|--|-------------|-------------|-------------|-------------|---------------|-------------|
| | | EFA (n=244) | | CFA (n=274) | | Total (n=518) | |
| | | Mean | SD | Mean | SD | Mean | SD |
| | Subscale 5: Education, training and supervision | 1.98 | 0.73 | 2.04 | 0.72 | 2.01 | 0.72 |
| Item03 | My workload does not allow me sufficient time to review evidence for my case presentations. | 1.27 | 1.06 | 1.48 | 1.13 | 1.38 | 1.10 |
| Item05 | There is systematic, structured training in EBM at my institution. | 1.84 | 1.13 | 1.91 | 1.17 | 1.88 | 1.15 |
| Item07 | I receive regular feedback from faculty / seniors on my application of EBM. | 1.81 | 1.05 | 1.82 | 1.03 | 1.81 | 1.04 |
| Item16 | Residents / Registrars address clinical questions through a formal review of the evidence. | 2.22 | 1.02 | 2.23 | 1.06 | 2.22 | 1.04 |
| Item35 | Faculty / The consultants taught me how to read and critique the scientific literature. | 1.93 | 1.06 | 1.92 | 1.08 | 1.92 | 1.07 |
| Item39 | The EBM materials on the computer at work are up-to-date. | 2.09 | 1.06 | 2.14 | 1.03 | 2.11 | 1.04 |
| Item62 | Residents / Registrars get a good foundation in EBM. | 1.92 | 1.08 | 1.85 | 1.05 | 1.88 | 1.06 |
| Item64 | I have attended seminars or discussions on searching the literature and the critical appraisal of articles during my residency / since starting to work as a resident / registrar. | 2.24 | 1.18 | 2.32 | 1.15 | 2.28 | 1.16 |
| Item66 | Faculty / Consultants give me regular feedback on my EBM knowledge and skills. | 1.95 | 0.94 | 2.05 | 0.99 | 2.01 | 0.97 |
| Item04 | For the patients that I am taking care of, I am able to assess the validity of the evidence that I have found. | 2.31 | 0.91 | 2.36 | 0.92 | 2.34 | 0.92 |
| Item11 | I have the opportunity to identify my knowledge gaps in EBM. | 2.17 | 1.01 | 2.39 | 1.01 | 2.29 | 1.01 |
| | | | | | | | |
| | Subscale 6: EBM Application opportunities | 2.44 | 0.59 | 2.46 | 0.60 | 2.45 | 0.59 |
| Item13 | For the patients that I am taking care of, I am able to figure out what I need to know. | 2.93 | 0.63 | 2.86 | 0.73 | 2.90 | 0.69 |
| Item19 | For the patients that I am taking care of, I am able to apply the valid evidence that I have found to the patient. | 2.68 | 0.77 | 2.78 | 0.69 | 2.74 | 0.73 |
| Item25 | I am allocated sufficient time for applying EBM principles in my clinical cases. | 1.80 | 1.06 | 1.89 | 1.07 | 1.85 | 1.06 |
| Item32 | I was taught how to interpret a meta-analysis of studies. | 1.93 | 1.11 | 1.84 | 1.11 | 1.88 | 1.11 |
| Item37 | When I take care of patients, I have the opportunity to review relevant literature. | 2.25 | 0.99 | 2.31 | 1.00 | 2.28 | 1.00 |
| Item44 | I feel comfortable in generating clinical questions. | 2.39 | 0.87 | 2.36 | 0.96 | 2.37 | 0.92 |
| Item46 | There are ample opportunities for me to apply my knowledge of EBM in patient care. | 2.46 | 0.95 | 2.46 | 0.95 | 2.46 | 0.95 |
| Item56 | For the patients that I am taking care of, I am able to find the evidence needed to apply to the patient. | 2.60 | 0.82 | 2.62 | 0.83 | 2.61 | 0.82 |
| Item59 | When I take care of patients, I have the opportunity to ask a focused clinical question. | 2.79 | 0.80 | 2.84 | 0.79 | 2.82 | 0.79 |
| Item61 | My seniors expect me to review the evidence when taking care of a patient. | 2.55 | 0.95 | 2.60 | 0.93 | 2.57 | 0.94 |

| | | Data | | | | | |
|--------|---|-------------|-------------|-------------|-------------|---------------|-------------|
| | | EFA (n=244) | | CFA (n=274) | | Total (n=518) | |
| | | Mean | SD | Mean | SD | Mean | SD |
| | Subscale 7: Affirmation of EBM environment | 2.42 | 0.72 | 2.44 | 0.75 | 2.43 | 0.73 |
| Item06 | It does not really help to review evidence when taking care of a patient. | 2.87 | 0.98 | 2.95 | 0.95 | 2.92 | 0.96 |
| Item08 | Faculty / Consultants do not promote EBM among residents / registrars. | 2.34 | 1.10 | 2.30 | 1.13 | 2.32 | 1.11 |
| Item12 | The environment in which I work discourages initiative. | 2.43 | 1.08 | 2.50 | 1.08 | 2.47 | 1.08 |
| Item22 | EBM in clinical practice is not valued in my department. | 2.64 | 1.01 | 2.61 | 1.09 | 2.62 | 1.05 |
| Item52 | I seldom have the opportunity to use EBM when I am presenting cases. | 1.97 | 1.05 | 1.99 | 1.10 | 1.98 | 1.07 |
| Item57 | My fellow residents / registrars are not keen on using EBM principles. | 2.24 | 0.96 | 2.30 | 0.95 | 2.27 | 0.96 |

Table B. Cronbach's alpha per model and dimension for CFA data (n=274)

| Factor 5: | No. of items | α | Factor 6: | No. of items | α |
|------------------|---------------------|----------------------------|------------------|---------------------|----------------------------|
| 1 | 28 | 0.96 | 1 | 10 | 0.89 |
| 2 | 10 | 0.89 | 2 | 25 | 0.96 |
| 3 | 13 | 0.88 | 3 | 12 | 0.87 |
| 4 | 10 | 0.86 | 4 | 8 | 0.86 |
| 5 | 6 | 0.81 | 5 | 6 | 0.81 |
| | | | 6 | 6 | 0.81 |
| | Total: 67 | Mean: 0.88 | | Total: 67 | Mean: 0.87 |
| Factor 7: | No. of items | α | Factor 8: | No. of items | α |
| 1 | 8 | 0.88 | 1 | 7 | 0.88 |
| 2 | 10 | 0.89 | 2 | 11 | 0.92 |
| 3 | 8 | 0.85 | 3 | 15 | 0.93 |
| 4 | 14 | 0.93 | 4 | 6 | 0.81 |
| 5 | 9 | 0.86 | 5 | 5 | 0.79 |
| 6 | 12 | 0.88 | 6 | 6 | 0.81 |
| 7 | 6 | 0.81 | 7 | 10 | 0.87 |
| | | | 8 | 7 | 0.83 |
| | Total: 67 | Mean: 0.87 | | Total: 67 | Mean: 0.86 |
| Factor 9: | No. of items | α | | | |
| 1 | 5 | 0.89 | | | |
| 2 | 17 | 0.94 | | | |
| 3 | 7 | 0.81 | | | |
| 4 | 7 | 0.82 | | | |
| 5 | 5 | 0.79 | | | |
| 6 | 11 | 0.89 | | | |
| 7 | 5 | 0.74 | | | |
| 8 | 6 | 0.87 | | | |
| 9 | 4 | 0.80 | | | |
| | Total: 67 | Mean: 0.84 | | | |

Table C. Cronbach's alphas for other instruments

| Instrument | Subscale | Cronbach's alpha | | | | |
|----------------------|--|---|---|---------------------------------------|---|--------------------------------------|
| | | De Oliveira Filho et al ² (n=62) | De Oliveira Filho et al ³ (n=97) | Dimoliatis et al ⁴ (n=487) | Hammond et al ⁵ (n=239) | Jakobsson et al ⁶ (n=503) |
| DREEM ¹ | (1) Students' perceptions of learning | - | 0.82 | 0.79 | 0.78 | 0.807 |
| | (2) Students' perceptions of teachers | - | 0.81 | 0.78 | 0.69 | 0.785 |
| | (3) Students' academic self-perceptions | - | 0.58 | 0.69 | 0.74 | 0.720 |
| | (4) Students' perceptions of atmosphere | - | 0.81 | 0.68 | 0.56 | 0.786 |
| | (5) Students' social self-perceptions | - | 0.69 | 0.48 | 0.55 | 0.689 |
| | Overall global scores | 0.92 | 0.93 | 0.90 | 0.89 | 0.930 |
| STEEM ⁷ | | | | Surgical trainees (n=26) | Medical students (n=83) | |
| | (1) Trainees' perceptions of their trainer and training | | | 0.84 | 0.84 | |
| | (2) Trainees' perceptions of learning opportunities | | | 0.59 | 0.54 | |
| | (3) Trainees' perceptions of atmosphere in the operating theatre | | | 0.57 | 0.69 | |
| | (4) Trainees' perceptions of supervision, workload and support | | | 0.57 | 0.65 | |
| Overall global score | | | 0.88 | 0.86 | | |
| PHEEM ⁸ | | Clapham et al ⁹ (n=134) | Aspegren et al ¹⁰ (n=342) | Riquelme et al ¹¹ (n=125) | Schönrock-Adema et al ¹² (n=279) | Wall et al ¹³ (n=1563) |
| | (1) Perceptions of role autonomy | - | - | - | 0.92 | (0.802) |
| | (2) Perceptions of teaching | - | - | - | 0.61 | (0.623) |
| | (3) Perceptions of social support | - | - | - | 0.66 | (0.538) |
| | Overall global score | 0.921 | 0.93 | 0.955 | 0.91 | 0.928 |
| ATEEM ¹⁴ | | (n=218) | | | | |
| | (1) Autonomy | - | | | | |
| | (2) Perceptions of atmosphere | - | | | | |
| | (3) Workload/Supervision/Support | - | | | | |
| | (4) Perception of teachers and teaching | - | | | | |
| Overall global score | - | | | | | |
| D-Rect ¹⁵ | | (n=600) | | | | |
| | (1) Supervision | 0.64 | | | | |
| | (2) Coaching and assessment | 0.80 | | | | |
| | (3) Feedback | 0.75 | | | | |
| | (4) Teamwork | 0.69 | | | | |
| | (5) Peer collaboration | 0.76 | | | | |
| | (6) Professional relations between attendings | 0.77 | | | | |
| | (7) Work is adapted to residents' competence | 0.66 | | | | |
| | (8) Attendings' role | 0.85 | | | | |
| | (9) Formal education | 0.75 | | | | |
| | (10) Role of the specialty tutor | 0.78 | | | | |
| | (11) Patient sign out | 0.75 | | | | |
| Overall global score | - | | | | | |

References

- ¹ Roff S, McAleer S, Harden R, Al-Qahtani M, Ahmed A, Deza H, et al. Development and validation of the Dundee Ready Education Environment measure (DREEM). *MedTeacher*. 1997;19(4):295-9.
- ² De Oliveria Filho GR, Sturm EJH, Sartorato AE. Compliance with common program requirements in Brazil: its effects on resident's perceptions about quality of life and the educational environment. *Acad Med*. 2005;70(1): 98-102.
- ³ De Oliveria Filho GR, Veiera JE, Schonhorst L. Psychometric properties of the Dundee Ready Educational Environment Measure (DREEM) applied to medical residents. *Med Teacher*. 2005;27(4):343-347.
- ⁴ Dimoliatis IDK, Vasilaki E, Anastassopoulos P, Ioannidis JPA, Roff S. Validation of the Greek translation of the Dundee Ready Education Environment Measure (DREEM). *Educ for Health*. 2010;23(1): 1-16
- ⁵ Hammond SM, O'Rourke M, Kelly M, Bennett D, O'Flynn S. A psychometric appraisal of the DREEM. *BMC Med Educ*. 2012;12:2. (doi:10.1186/1472-6920-12-2).
- ⁶ Jakobsson U, Danielsen N, Edgren G. Psychometric evaluation of the Dundee Ready Educational Environment Measure: Swedish version. *Med Teacher*. 2011;33:e267-e274. (DOI: 10.3109/0142159X.2011.558540)
- ⁷ Nagraj S, Wall D, Jones E. Can STEEM be used to measure the educational environment within the operating theatre for undergraduate medical students? *Med Teacher*. 2006;28(7):642-647.
- ⁸ Roff S, McAleer S, Skinner A. Development and validation of an instrument to measure the postgraduate clinical learning and teaching educational environment for hospital-based junior doctors in the UK. *Med Teacher*. 2005;27(4):326-331.
- ⁹ Clapham M, Wall D, Batchelor A. Educational environment in intensive care medicine - use of Postgraduate Hospital Educational Environment Measure (PHEEM). *Med Teacher*. 2007;29:e184-e191.
- ¹⁰ Aspegren K, Bastholt L, Bested KM, Bonnesen T, Ejlersen E, Fog I, et al. Validation of the PHEEM instrument in a Danish hospital. 2007, 29: 504-506. *Med Teacher*. 2007;29:504-6.
- ¹¹ Riquelme A, Herrera C, Aranis C, Oporto J, Padilla O. Psychometric analyses and internal consistency of the PHEEM questionnaire to measure the clinical learning environment in the clerkship of a Medical School in Chile. *Med Teacher*. 2009;31:e221-e225. (DOI: 10.1080/01421590902866226)
- ¹² Schönrock-Adema J, Heijne-Penninga M, Van Hell EA, Cohen-Schotanus J. Necessary steps in factor analysis: Enhancing validation studies of educational instruments. The PHEEM applied to clerks as an example. *Med Teacher*. 2008;31:e226-e232. (DOI: 10.1080/01421590802516756)
- ¹³ Wall D, Clapham M, Riquelme A, Vieira J, Cartmill R, Aspegren K, Roff S. Is PHEEM a multi-dimensional instrument? An international perspective. *Med Teacher*. 2009;31:e521-e527. (DOI: 10.3109/01421590903095528)
- ¹⁴ Holt MC, Roff S. Development and validation of the Anaesthetic Theatre Educational Environment Measure (ATEEM). *Med Teacher*. 2004;26(6):553-558.
- ¹⁵ Boor K, Van der Vleuten C, Teunissen P, Scherpbier A, Scheele F. Development and analysis of D-RECT, an instrument measuring residents' learning climate. *Med Teacher*. 2011;33:820-827.