

Practice-based Learning and Improvement

Assessment References I

Analyze and improve own practice

1. Aitken RJ, Nixon SJ, Ruckley CV. Lothian Surgical Audit: a 15-year experience of improvement in surgical practice through regional computerized audit. *Lancet* 1997;350:800-4.
This report suggests that a local surgeon-driven, longitudinal and educationally-oriented audit has resulted in local surgical practice improvements.
2. Bradley CP. Uncomfortable prescribing decisions: a critical incident study. *BMJ* 1992;304:294-6.
Use of the critical incident technique to examine the rational and affective aspects of physician prescribing is described in this report.
3. Campbell CM, Parboosingh JT, Gondocz ST, Babitskaya G, Lindsay E, De Guzman RC, Klein LM. Study of physicians' use of a software program to create a portfolio of their self-directed learning. *Acad Med* 1996;71(10 suppl):S49-51.
The results of this study indicate that a computer-based diary may help physicians to record and reflect upon their learning activities.
4. Challis M, Mathers NJ, Howe AC, Field NJ. Portfolio-based learning: continuing medical education for general practitioners: a mid-point evaluation. *Med Educ* 1997;31:22-6.
This study suggests that a portfolio approach to engaging in and assessing continuing medical education (CME) was effective in terms of learning objectives achieved, but less efficient than a traditional approach to CME.
5. Donen N. No to mandatory continuing medical education, Yes to mandatory practice auditing and professional educational development. *CMAJ* 1998;158:1044-6.
The writer describes a portfolio approach that physicians may use to document their professional educational development.
6. Fidler H, Lockyer JM, Toews J, Violato C. Changing physicians' practices: the effect of individual feedback. *Acad Med* 1999;74:702-14.
This study suggests that written feedback from peers, patients, co-workers and referring physicians can prompt changes in physicians' practice behavior.
7. Fung Kee Fung M, Walker M, Fung Kee Fung K, Temple L, Lajoie F, Bellemare G, et al. An internet-based learning portfolio in resident education: the KOALA™ multicentre programme. *Med Educ* 2000;34:474-9.
This report concludes that an internet-based learning portfolio enhanced residents' perceptions of their readiness for self-directed learning.
8. Gonnella JS, Louis DZ. Physicians' responsibilities and the evaluation of outcomes of medical care.

In: Markson LE, Nash DB, editors. Accountability and quality in health care: the new responsibility. Oakbrook, IL: Joint Commission on Accreditation of Healthcare Organizations; 1995. p. 205-28. *The authors suggest that measures and methods to evaluate and change physician performance, respectively, be consistent with the diverse roles of physicians as clinicians, educators, and managers.*

9. Gordon MJ. Self-assessment programs and their implications for health professions training. Acad Med 1992;67:672-9.

Following a review of 11 studies, the author suggests that the validity of self-assessed performance by health professions trainees can be improved by requiring learners to systematically gather information on their performances and reconcile their assessments with external evaluation sources.

10. Hall W, Violata C, Lewkonja R, Lockyer J, Fidler H, Toews J. et al. Assessment of physician performance in Alberta: the Physician Achievement Review. CMAJ 1999;161:52-7.

This paper summarizes an approach to the routine assessment of practicing physicians that requires the completion of questionnaires by physicians, their peers, coworkers, and patients.

11. Harris IB, Wempner J. Continuing medical education reconceived: evaluation of a sabbatical program for physicians. Acad Med 1996;71 (10 suppl):S46-8.

The impact of a sabbatical program designed to simultaneously enhance practicing physicians' professional development and benefit community health is presented in this paper.

12. Jenson GM, Saylor C. Portfolios and professional development in the health professions. Eval Health Prof 1994;17:344-57.

This paper suggests that portfolios enabled nursing and physical therapy students to reflect upon their professional development.

13. Lough JRM, Murray TS. Audit and summative assessment: a completed audit cycle. Med Educ 2001;35:357-63.

The process used to examine the reliability of a checklist to assess audit projects (projects that demonstrate the ability to analyze and improve a specific component of one's own practice) is described.

14. Mathers NJ, Challis MC, Howe AC, Field NJ. Portfolios in continuing medical education - effective and efficient? Med Educ 1999;33:521-30.

In this study, portfolio-based learning and assessment was compared to a traditional approach to postgraduate educational accreditation of general practitioners in England.

15. Mittal V, David W, Young S, McKendrick A, Gentile T, Casalou R. Improved continuity of care in a community teaching hospital model. Arch Surg 1999;134:555-8.

In this report, surgical office logs were used to determine the extent to which residents improved the provision of continuity of care.

16. Palmer RH, Hargreaves JL. The ambulatory care medical audit demonstration project: research design. *Med Care* 1996;34:SS12-28.
In this study, improving patient care was defined in terms of the extent to which selected practice guidelines were followed.
17. Pee B, Woodman T, Fry H, Davenport ES. Practice-based learning: views on the development of a reflective learning tool. *Med Educ* 2000;34:754-61.
This qualitative study summarizes dental student and tutor opinions about reflection and the use of a progress file to reflect on and monitor progress in learning.
18. Scher KS, Scott-Connor CEH. Making peer review statistically accountable. *Amer J Surg* 1996;171:441-4.
This paper describes the use of aggregate patient outcomes for a local community of surgeons as a benchmark for examining the practices of individual surgeons in the community.
19. Snadden D, Thomas ML. Portfolio learning in general practice vocational training: does it work? *Med Educ* 1998;32:401-6.
The use of portfolios as a learning and formative assessment tool for registrars (residents) who transition to practice is described in this paper.
20. Tracey JM, Arroll B, Richmond DE, Barham PM. The validity of general practitioners' self assessment of knowledge: cross sectional study. *BMJ* 1997;315:1426-8.
The results of this study indicate a poor correlation between physicians' actual and self-assessed knowledge of specific clinical topics.

Assessment References II

Use of evidence from scientific studies and application of research and statistical methods

21. Bennett KJ, Sackett DL, Haynes RB, et al. A controlled trial of teaching critical appraisal of the clinical literature to medical students. *JAMA* 1987;257:2451-54.
The results of this study suggest that tutor training and subsequent student sessions in critical appraisal had a positive effect on students' skills in this area.
22. Bradley P, Humphris G. Assessing the ability of medical students to apply evidence in practice: the potential of the OSCE. *Med Educ* 1999;33:815-7.
This study suggests that it is feasible to assess the application of evidence-based medicine (EBM) concepts via Objective Structured Clinical Examination stations.
23. Green ML, Ellis PJ. Impact of an evidence-based medicine curriculum based on adult learning theory. *J Gen Intern Med* 1997;12:742-50.
This report indicates that an EBM curriculum, which included a resident-directed tutorial format and real clinical encounters, had a positive impact on residents' EBM knowledge and self-

reported EBM behaviors.

24. Hyde C, Parkes J, Deeks J, Milne R. Systematic review of effectiveness of teaching critical appraisal. In: The Cochrane Library, Issue 1, 2001. Oxford: Update software.

This systematic review concludes that critical appraisal teaching has a positive impact on knowledge, attitudes, and skills, but its impact on decision-making and patient outcomes is unclear.

25. Khan KS, Awonuga AO, Dwarakanath LS, Taylor R. Assessments in evidence-based medicine workshops: loose connections between perception of knowledge and its objective assessment. *Med Teach* 2001;23:92-4.

Poor to moderate correlations between actual and self-assessed knowledge of EBM among health care professionals are reported in this paper.

26. Kitchens JM, Pfeifer MP. Teaching residents to read the medical literature: a controlled trial of a curriculum in critical appraisal/clinical epidemiology. *J Gen Intern Med* 1989;4:384-7.

In this paper, a clinical epidemiology quiz was used to assess and confirm the positive impact of a clinical epidemiology and literature appraisal course for residents.

27. Landry FJ, Pangaro L, Kroenke K, Lucey C, Herbers J. A controlled trial of a seminar to improve medical student attitudes toward , knowledge about, and use of the medical literature. *J Gen Intern Med* 1994;9:436-9.

This report indicates that two interactive sessions on critical appraisal had a positive effect on medical students' knowledge and attitudes, but no impact on the use of literature in patient write-ups.

28. Linzer M, Brown JT, Frazier LM, Delong ER, Siegel WC. Impact of a medical journal club on house-staff reading habits, knowledge, and critical appraisal skills. *JAMA* 1988;260:2537-41.

This study suggests that participation in a journal club improved residents' reading habits and related knowledge, but did not appear to impact their ability to critically appraise an article.

29. McColl A, Smith H, White P, Field J. General practitioners' perceptions of the route to evidence based medicine: a questionnaire survey. *BMJ* 1998;316:361-5.

General practitioners' opinions about EBM, access to EBM resources, and knowledge of EBM terminology are described in this study.

30. Neville AJ, Reiter HI, Eva KW, Norman GR. Critical appraisal turkey shoot: linking critical appraisal to clinical decision making. *Acad Med* 2000;75:S87-S89.

This paper describes an approach to assessing students' ability to identify methodological flaws in the literature and use this information to judge the conclusions of articles.

31. Norman GR, Shannon SI. Effectiveness of instruction in critical appraisal (evidence-based medicine) skills: A critical appraisal. *CMAJ* 1998;158:177-81.

A review of seven studies indicates that medical students were more likely than residents to gain knowledge following critical appraisal skills education.

32. Olatunbosun OA, Edouard L, Pierson RA. Physicians' attitudes toward evidence-based obstetric practice: a questionnaire survey. *BMJ* 1998;316:365-6.

Physicians' opinions about EBM in obstetric practice are summarized in this report.

33. Radack KL, Valanis B. Teaching critical appraisal and application of medical literature to clinical problem-solving. *J Med Educ* 1986;61:329-31.

This article suggests that medical student participation in critical appraisal sessions did not significantly enhance their critical appraisal skills compared to non-participants.

34. Riegelman RK. Effects of teaching first-year medical students skills to read medical literature. *J Med Educ* 1986;61:454-60.

This report indicates that a course designed to teach first-year medical students how to read the medical literature had a positive effect on their self-reported competence and knowledge of these skills.

35. Seelig CB. Affecting residents' literature reading attitudes, behaviors and knowledge through a journal club intervention. *J Gen Intern Med* 1991;6:330-4.

When combined with a journal club, a one-hour seminar appeared to improve residents' critical appraisal knowledge and self-reported ability to appraise original research articles.

36. Seelig CB. Changes over time in the knowledge acquisition practices of internists. *Southern Med J* 1993;86:780-3.

The results of this study suggest that internists' approaches to keeping up with the literature change little over time.

37. Smith CA, Ganschow PS, Reilly BM. Teaching residents evidence-based medicine skills: a controlled trial of effectiveness and assessment of durability. *J Gen Intern Med* 2000;15:710-5.

In this report, a seven-week EBM skills course resulted in sustained improvements in selected EBM skills as measured by repeated, longitudinal assessment.

38. Stern DT, Linzer M, O'Sullivan PS, Weld L. Evaluating medical residents' literature appraisal skills. *Acad Med* 1995;70:152-4.

This study indicates no significant association between residents' self-assessed and actual ability to critically appraise a journal article.

39. Taylor R, Reeves B, Ewings P, Binns S, Keast J, Mears R. A systematic review of the effectiveness of critical appraisal skills training for clinicians. *Med Educ* 2000;34:120-5.

This review of ten studies, indicates that training has a positive impact on critical appraisal skills, but the writers urge caution in interpreting these findings due to methodological shortcomings in the studies reviewed.

40. Taylor R, Reeves B, Mears R, et al. Development and validation of a questionnaire to evaluate the effectiveness of evidence-based practice teaching. *Med Educ* 2001;35:544-7.

This report describes the creation and validation of the Critical Appraisal Skills Programme Workshop Evaluation Questionnaire.

41. Wainwright JR, Sullivan FM, Morrison JM, et al. Audit encourages an evidence-based approach to medical practice. *Med Educ* 1999;33:907-14.

The implementation and evaluation of a course designed to incorporate scientific evidence into practice are described in this paper.

Assessment References III

Use of information technology

42. Balas EA, Austin SM, Mitchell JA, Ewigman BG, Bopp KD, Brown GD. The clinical value of computerized information services. *Arch Fam Med* 1996;5:271-8.

In this systematic review of 100 trials, the process of health care was positively affected by computerized provider and patient reminders, computer-assisted treatment planners, and interactive patient education or therapy.

43. Bouchard RE, Tufo HM, Beaty HN. The impact of a quality assurance program on postgraduate training in internal medicine. In: Lloyd J, editor. *How to evaluate residents*. Chicago, IL: American Board of Medical Specialties, 1986; p. 189-200.

This report describes an audit approach to assessing changes in residents' use of an electronic medical record system.

44. Chan M, Fox NJ, Clamp SE, de Dombal FT. An information technology course in the medical curriculum. *Med Educ* 1996;30:112-20.

The content of an information technology (IT) course for medical students and its evaluation in terms of technical skills and attitudes are described in this paper.

45. Cork RD, Detmer WM, Friedman CP. Development and initial validation of an instrument to measure physicians' use of, knowledge about, and attitudes toward attitudes. *JAMIA* 1998;5:164-76.

The process of designing and validating the "Computers in Medical Care" questionnaire is described.

46. Devitt P, Palmer E, Worthley S, Cehic D. Evaluation of a computer-based package on electrocardiography. *Aust NZ Med* 1998;28:432-5.

The results of this study suggest that participation in an interactive, computer-based tutorial improved learners' knowledge of electrocardiography and their ability to interpret ECGs.

47. Devitt P, Cehic D, Palmer E. Computers in medical education 2. Use of a computer package to supplement the clinical experience in a surgical clerkship: an objective evaluation. *Aust NZ J Surg*

1998;68:428-31.

This report indicates that a case-based, interactive software program facilitated student learning.

48. Dixon DR, Stewart M. Exploring information technology adoption by family physicians: survey instrument validation. Proceedings of the American Medical Informatics Association 2000 Annual Symposium; 2000 Nov 4-8; Los Angeles, CA. Philadelphia: Hanley & Belfus; 2000.

This study suggests that self-reported IT use is related to several variables that include, intent and interest in using IT, perceived usefulness and ease of use, and knowledge.

49. Erikson S, Warner ER. The impact of an individual tutorial session on MEDLINE use among obstetrics and gynecology residents in an academic training programme: a randomized trial. Med Educ 1998;32:269-73.

Although residents reported satisfaction with a one-hour tutorial on using a literature search engine, the results of this study suggest that it did not improve their ability to find relevant articles.

50. Gugerty B, Wooldridge P, Brennan M. The CISQ: a tool to measure staff involvement in and attitudes toward the implementation of a clinical information system. Proceedings of the American Medical Informatics Association 2000 Annual Symposium; 2000 Nov 4-8; Los Angeles, CA. Philadelphia: Hanley & Belfus; 2000.

The development and technical characteristics of the Clinical Information System Questionnaire are described in this paper.

51. Hunt DL, Haynes BR, Hanna SE, Smith K. Effects of computer-based clinical decision support systems on physician performance and patient outcomes: a systematic review. JAMA 1998;280:1339-1346.

This systematic review of 68 trials suggests that computer-based clinical decision support systems improve physician performance. With regard to patient outcomes, the results are inconclusive.

52. Jerant AF, Lloyd AJ. Applied medical informatics and computing skills of students, residents, and faculty. Fam Med 2000;32:267-72.

The results of this survey indicate that senior family medicine residents expressed less comfort using and knowledge of computers than medical students, faculty, and junior residents.

53. Lenhart JG, Honess K, Covington D, Johnson KE. An analysis of trends, perceptions, and use patterns of electronic medical records among US family practice residency programs. Fam Med 2000;32:109-14.

This study of family practice residency programs suggests that the use of electronic medical records (EMR) is relatively low and perceived benefits of EMR is greater among non-users than users.

54. Lewis YL, Bredfeldt RB, Strode SW, D'Arezzo KW. Changes in residents' attitudes and achievement after distance learning via two-way interactive video. *Fam Med* 1998;30:497-500. *This report indicates that distance learning did not have a differential effect on residents' knowledge acquisition, but it did have a negative impact on their attitudes toward learning by interactive video.*

55. McGlade KJ, McKeveney CJ, Crawford VLS, Brannigan P. Preparing tomorrow's doctors: the impact of a special study module in medical informatics. *Med Educ* 2001;35:62-7. *In this paper, the content and evaluation of a medical informatics course for medical and dental students are described.*

56. Polyakov A, Palmer E, Devitt PG, Coventry BJ. Clinicians and computers: friends or foes? *Teach Learn Med* 2000;12:91-95. *Clinical teachers and residents' opinions about and experience using computers are described in this report.*

Assessment References IV

Facilitate learning of others

57. Bardes CL, Hayes JG. Are the teachers teaching? Measuring the educational activities of clinical faculty. *Acad Med* 1995;70:111-4. *The authors describe the Relative Value Scale in Teaching, an approach to quantifying a broad scope of teaching activities that occur in medical settings.*

58. Bing-You RG, Tooker J. Teaching skills improvement programmes in US internal medicine residencies. *Med Educ* 1993;27:259-65. *The results of this study suggest that in 1990 about 20% of internal medicine residency programs provided formal instruction in teaching skills for residents.*

59. Bing-You RG, Greenberg LW, Wiederman BL, Smith CS. A randomized multicenter trial to improve resident teaching with written feedback. *Teach Learn Med* 1997;9:10-3. *The results of this study suggest that written feedback improves senior residents' teaching skills as assessed by the Clinical Teaching Assessment Form.*

60. Copeland HL, Hewson MG. Developing and testing an instrument to measure the effectiveness of clinical teaching in an academic medical center. *Acad Med* 2000;75:161-6. *The processes of designing and determining the psychometric characteristics of the Clinical Teaching Effectiveness Instrument are described in this study.*

61. Dunnington GL, DaRosa D. A prospective randomized trial of a residents-as-teachers training program. *Acad Med* 1998;73:696-700. *In this report, a two-day course for improving surgery residents' teaching skills was designed*

following a needs assessment and evaluated using a five-station objective structured teaching evaluation.

62. Griffith CH, Wilson JF, Haist SA, Ramsbottom-Lucier M. Do students who work with better house staff in their medicine clerkships learn more? Acad Med 1998;73(10 suppl):S57-S59.

The results of this study suggest that residents and attendings influence medical student learning.

63. Hafler JP, Lovejoy FH. Scholarly activities recorded in the portfolios of teacher-clinician faculty. Acad Med 2000;75:649-52.

Examination of physician-educator portfolios revealed evidence of scholarly activity in terms of teaching roles and awards, publications and teaching materials, and committee membership.

64. Irby DM. Evaluating resident teaching. In: Edwards JC, Marier RL, editors. Clinical teaching for medical residents. New York: Springer Publishing Company, 1988; p. 121-8.

The writer discusses criteria and strategies for evaluating resident teaching with an emphasis on learner rating forms.

65. Johnson CE, Bachur R, Priebe C, Barnes-Ruth A, Lovejoy FH, Palmer Hafler J. Developing residents as teachers: process and content. Pediatrics 1996;97:907-16.

In this paper, the process of designing, implementing, and evaluating a teaching skills improvement program for pediatric residents is described.

66. Litzelman DK, Stratos GA, Marriott DJ, Skeff KM. Factorial validation of a widely disseminated educational framework for evaluating clinical teachers. Acad Med 1998;73:688-95.

Evidence for the construct validity and inter-item consistency of a questionnaire designed to assess teaching skills is described in this study.

67. Marriott DJ, Litzelman DK. Students' global assessments of clinical teachers: a reliable and valid measure of teaching effectiveness. Acad Med 1998;73(10 Suppl):S72-4.

This study describes the concurrent validity and reliability of global assessments of clinical teaching.

68. Myers KA. Evaluating clinical teachers: does the learning environment matter? Acad Med 2001;76:286.

This report suggests that students' ratings of clinical teaching may be influenced by whether it occurred in inpatient or outpatient settings.

69. Nasmith L, Steinert Y, Saroyan A, Daigle N, Franco E. Assessing the impact of a faculty development workshop: a methodological study. Teach learn Med 1997;9:209-14.

In this report, the effects of a course on small group teaching were assessed by examining changes in attitudes, knowledge, and teaching behaviors.

70. Pitts J, Coles C, Thomas P. Educational portfolios in the assessment of general practice trainers:

reliability of assessors. *Med Educ* 1999;33:515-20.

This study suggests that due to relatively poor inter-rater reliability, portfolios may be inadequate for summative assessment of teaching.

71. Premadasa IG, Hijazi Z, Moosa A. An instrument to evaluate clinical instruction skills. *Med Educ* 1995;29:355-9.

Development of a ten-item questionnaire to assess clinical teaching is described in this paper.

72. Skeff KM, Berman J, Stratos G. A review of clinical teaching improvement methods and a theoretical framework for their evaluation. In: Edwards JC, Marier RL, editors. *Clinical teaching for medical residents*. New York: Springer Publishing Company, 1988; p. 92-120.

By describing several theory-based approaches to improving teaching, the writers suggest also variables that might be assessed to ascertain improvement.

73. Skeff KM, Stratos GA, Berman J, Bergen MR. Improving clinical teaching: evaluation of a national dissemination program. *Arch Intern Med* 1992;152:1156-61.

In this study, the effects of a faculty development program were assessed by examining changes in participants' self-assessed and learner-assessed teaching performance, and by dissemination activities.

74. Snell L, Tallett S, Haist S, Hays R, Norcini J, Prince K, et al. A review of the evaluation of clinical teaching: new perspectives and challenges. *Med Educ* 2000;34:862-70.

In this paper, measurement principles pertinent to evaluating clinical teaching are discussed, assessment methods are reviewed, and a rationale for expanding the scope of evaluation is presented.

75. Weiss V, Needlman R. To teach is to learn twice. *Arch Pediatr Adolesc Med* 1998;152:190-2.

This study suggests that residents who taught a topic acquired more knowledge than those who attended lectures on the same topic.

76. Wipf JE, Orlander JD, Anderson JJ. The effect of a teaching skills course on interns' and students' evaluations of their resident-teachers. *Acad Med* 1999;74:938-42.

In this study, analyses of six years of data suggest that a six-hour teaching skills course significantly improved residents' teacher ratings.