

Systems-Based Practice: The Sixth Core Competency

Pamela L. Dyne, MD, Robert W. Strauss, MD, Stephan Rinnert, MD

Abstract

Systems-Based Practice (SBP) is the sixth competency defined by the Accreditation Council for Graduate Medical Education (ACGME) Outcome Project. Specifically, SBP requires "Residents [to] demonstrate an awareness of and responsiveness to the larger context and system of health care and the ability to effectively call on system resources to provide care that is of optimal value." This competency can be divided into four subcompetencies, all of which are integral to training emergency medicine (EM) physicians: resources, providers, and systems; cost-appropriate care; delivery systems; and patient advocacy. In March 2002, the Council of Emergency Medicine Residency Directors (CORD-EM) convened a consensus conference to assist residency directors in modifying the SBP competency specific for EM. The Consensus Group modified the broad ACGME definition for SBP into EM-specific goals and objectives for residency training in SBP. The primary assessment methods from the Toolbox of Assessment Methods were also identified for SBP. They are direct observation, global ratings, 360-degree evaluations, portfolio assessment, and testing by both oral and written exams. The physician tasks from the Model of

the Clinical Practice of Emergency Medicine that are most relevant to SBP are out-of-hospital care, modifying factors, legal/professional issues, diagnostic studies, consultation and disposition, prevention and education, multitasking, and team management. Suggested EM residency curriculum components for SBP are already in place in most residency programs, so no additional resources would be required for their implementation. These include: emergency medical services and administrative rotations, directed reading, various interdisciplinary and hospital committee participation, continuous quality improvement project participation, evidence-based medicine instruction, and various didactic experiences, including follow-up, interdisciplinary, and case conferences. With appropriate integration and evaluation of this competency into training programs, it is likely that future generations of physicians and patients will reap the benefits of an educational system that is based on well-defined outcomes and a more systemic view of health care. **Key words:** systems; medical practice; core competency; assessment. *ACADEMIC EMERGENCY MEDICINE* 2002; 9:1270-1277.

Systems-Based Practice (SBP) is the sixth competency defined by the Accreditation Council for Graduate Medical Education (ACGME) Outcome Project. Specifically, SBP requires "Residents [to] demonstrate an awareness of and responsiveness to the larger context and system of health care and the ability to effectively call on system resources to provide care that is of optimal value."¹ With cursory consideration, this core competency might seem least grounded in traditional contemporary graduate medical education curricula. However, the identification of the new competencies was "stimulated by increased attention as to how adequately phy-

sicians are prepared to practice medicine in the changing health care delivery system." That SBP has been included as a "core" competency indicates that the ACGME Outcome Project developers recognize the critical need for direct attention to navigating the system itself as a key component to successful and effective patient care.

Part of the rationale for the ACGME to look at outcomes comes from a mandate by the U.S. Department of Education from the 1980s that was aimed at making greater use of outcome assessment in accreditation. Since the U.S. system of medical education depends heavily on public funding, medical educators have been called upon to offer evidence of responsible stewardship in preparing competent physicians to meet the health care needs of the public that supports their efforts. Although yet to be fully implemented, it is likely that future generations of physicians and patients will reap the benefits of an educational system that is based on well-defined outcomes and a more systemic view of health care.

RESOURCES, PROVIDERS, AND SYSTEMS

In order to train physicians to become aware of and involved in improving medical systems, physician

From the Department of Emergency Medicine, UCLA School of Medicine, Olive View-UCLA Medical Center, Los Angeles, CA (PLD); the Residency Review Committee for Emergency Medicine, Lansing, MI (RWS); and SUNY Downstate/Kings County Hospital, Brooklyn, NY (SR).

Received April 16, 2002; revision received June 15, 2002; accepted June 15, 2002.

Presented at the Council of Emergency Medicine Residency Directors (CORD) Consensus Conference on the ACGME Core Competencies: "Getting Ahead of the Curve," March 2002, Washington, DC.

Address for correspondence and reprints: Pamela L. Dyne, MD, Olive View-UCLA Medical Center, Department of Emergency Medicine, 14445 Olive View Drive, North Annex, Sylmar, CA 91342. Fax: 818-364-3268; e-mail: pdyne@ucla.edu.

educators must recognize the critical importance of the SBP competency. To an educator focused on teaching the details of thrombolytic therapy, SBP may seem an obscure concept. Yet, if one steps back and considers what actually is done when effectively managing patients, it becomes clearer. For example, when managing a patient with chest pain we must understand, access, and appropriately utilize multiple resources and systems, including emergency medical services (EMS), communications, emergency department (ED) staff support, laboratory services, diagnostic imaging services, consultants, and catheterization laboratories, to provide optimal care. Physicians in training must be taught to recognize the system components, evaluate the effectiveness of these systems and resources, and, when appropriate, effect change. This is the essence of the SBP competency.

COST-APPROPRIATE CARE

In 1998 *Annals of Internal Medicine* published a series of articles entitled "Physicians as Leaders in Improving Health Care."^{2,3} In the first of these articles, Nolan defines a system as, "a collection of interdependent elements that interact to achieve a common purpose."² Nolan describes the treatment of a patient with diabetes as including: a hospital; a county's out-of-hospital care system; and the development of interdepartmental admission guidelines. Even rudimentary understanding of the structures and dynamics of systems combined with clinical knowledge can equip a physician to diagnose the faults of a system and design remedies. A physician who is willing to learn about the nature of systems and how to control and improve them can significantly influence medical systems, potentially resulting in improvements in the care of multiple patients. Physician prominence in highly interdependent medical systems confers tremendous power on physicians, both individually and as a profession. With this power comes an ethical responsibility to be deeply concerned about the medical system as a whole. For example, if physicians focus on only patient outcomes while leaving others to worry about costs, they may find the ability to practice medicine confined by financial constraints. Effective instruction in SBP must incorporate training in the practice of cost-effective health care and resource allocation that does not compromise quality of care. Medical educators may indeed have an ethical responsibility to the American public (who funds medical education) to train physicians who have an understanding of the costs of medical care in this country.

DELIVERY SYSTEMS

Yedidia et al. looked at managed-care-related competencies important to both managed care medical directors and program directors.⁴ They questioned whether the inclusion of these topics in medical curricula was being hampered by attitude rather than perceived importance. The results of their study indicate that primary care residency directors and managed care medical directors value mastery of many of the same specific clinical competencies in managed care. Previous negative attitudes toward managed care among academic physicians seemingly obscured an underlying concordance about the skills essential to managing the health of populations. Different medical practice models and delivery systems and how to best utilize them to care for the individual patient are part of the EM curricula. Examples include discussions of diversion due to ED saturation, ED workup and disposition decisions depending on access to appropriate and timely follow-up, and details of Emergency Medical Treatment and Labor Act (EMTALA) regulations. Emergency physicians are already being trained in SBP from the first day of entering residency; however, program directors may not recognize this as such. The challenge to these educators is to document this instruction and apply appropriate assessment methods to ensure the residents have acquired the identified skills necessary to meet the SBP competency.

PATIENT ADVOCACY

While SBP issues may seem ambiguous, they are immediately grounded by our primary responsibility for the individual patient. It is an integral responsibility of the educator to train residents to advocate for and facilitate patients' advancement through the health care system. This concept is inherent in EM training throughout residency.

CORD-EM SYSTEMS-BASED PRACTICE CONSENSUS GROUP

The elements of SBP are already core EM curriculum topics. The challenge now is to assess resident progress in these content areas. To a large degree, the resident's achievement of this competency is already being assessed, though embedded in other aspects of practice assessment, such as efficiency, resource utilization, team management, and interpersonal communication skills. In March 2002, the CORD-EM Consensus Group developed the following EM-specific goals for residency training in SBP:

Emergency medicine residents must demonstrate

an awareness of health care systems and the ability to effectively mobilize system resources to provide optimal care. Upon completion of the residency, EM residents are expected to:

- Understand, access, appropriately utilize, and evaluate the effectiveness of the resources, providers, and systems necessary to provide optimal emergency care.
- Understand different medical practice models and delivery systems and how to best utilize them to care for the individual patient.
- Practice cost-effective health care and resource allocation that does not compromise quality of care.
- Advocate for and facilitate patients' advancement through the health care system.

ASSESSMENT METHODOLOGIES

Competency-based learning requires assessment to ensure the achievement of educational objectives. In the previous section, the educational objectives of SBP in EM have been described. This section presents the opinion of the Consensus Group with respect to the best methods of demonstrating competency in SBP. It is through assessment that training programs can demonstrate resident competency, improve the educational experience, and improve resident and residency program performance.⁵ To be useful, the instrument or tool, and the inferences made from it, must be valid, reliable, fair, and feasible (accomplishable by several evaluators and not excessively resource-intensive) (Appendix A). It is the goal of this process to define multiple assessment methodologies from which a program may choose the most practical, while at the same time meeting the other above characteristics.

Implementation. There are several approaches to assessment of SBP. One approach would incorporate the use of the physician tasks found in the Model of the Clinical Practice of Emergency Medicine (Model)⁶ (Table 1). Depending on how one interprets the physician tasks, it would be possible to assess the relevancy to SBP as a 1 (applicable), 2 (applicable in a wider context), or 3 (not applicable). The Consensus Group considered common EM practice when assigning relevancy. A residency program could reinterpret these tasks depending on its individual curriculum. For instance, a program with an observation (rapid-treatment) unit might assign observation and reassessment a "1." Emergency stabilization could be interpreted to include the concepts of triage and bedside registra-

tion as these are interrelated systems that profoundly affect the efficiency of patient care, resulting in the assignment of a "1" to this task. Table 1 lists the physician tasks from the Model with relevancy (value) to SBP. Table 2 lists the physician tasks from the Model with an SBP relevancy (value) of 1 along with the corresponding SBP sub-competencies.

Selecting from the Toolbox. The product of the ACGME/American Board of Medical Specialties (ABMS) joint initiative includes a "Toolbox of Assessment Methods"⁷ for consideration when evaluating the competencies of residents. The toolbox, while not meant to be all-inclusive, does include a variety of generic evaluation methodologies that may be adapted by the user to assess the residents. Each tool includes a description, common usage, psychometric qualities, feasibility, and references.

Primary Assessment Methodologies for Systems-Based Practice.

Direct observation is a primary assessment methodology that is particularly relevant to EM. Unlike other specialties, EM training incorporates 24-hour attending supervision, allowing direct assessment of resident performance and competence. While all of the EM physician tasks in the Model related to SBP can be effectively assessed through direct observation, multitasking and team management may be effectively evaluated *only* by direct observation.

Global rating of "observed" performance takes advantage of EM's unique opportunity to observe the trainee in the clinical setting. As EM training requires continuous supervision, "real-time" observation can occur. Typically a scale, such as 1 = superior, 2 = satisfactory, and 3 = unsatisfactory, is used. The program may develop questions to assess competence in these specific physician tasks. Sample questions are provided in Appendix B to evaluate resident competency in the specific physician tasks from the Model.

"360-degree evaluation" consist of measurement tools completed by multiple people in a person's sphere of influence.⁸ This multisource assessment tool gathers feedback from those working closely with the resident, such as nurses, peers, out-of-hospital care workers, and patients, rather than a single source, such as a supervisor. As Edwards and Ewen noted in a recent publication of this type of evaluation tool, "No organizational action has more power for motivating [resident] behavior change than feedback from credible work associates . . . [as they may be] more strongly motivated to change their work behaviors to attain the esteem of their

TABLE 1. Physician Tasks from the Model of the Clinical Practice of Emergency Medicine with Relevance to Systems-Based Practice (SBP)

Physician Tasks	Value	SBP Subcompetency
1. Out-of-hospital care	1	Resource, Delivery Systems
2. Emergency stabilization	3	
3. Focused history and physical	3	
4. Modifying factors	1	Resource, Delivery Systems, Cost-Appropriate Care, Patient Advocacy
5. Legal/professional issues	1	Delivery Systems, Cost-Appropriate, Patient Advocacy
6. Diagnostic studies	1	Resource, Delivery Systems, Cost-Appropriate Care
7. Therapeutic interventions	2	
8. Pharmacotherapy	2	
9. Observation and reassessment	2	
10. Consultation and disposition	1	Resource, Delivery Systems, Cost-Appropriate Care, Patient Advocacy
11. Prevention and education	1	Resource, Delivery Systems, Patient Advocacy
12. Documentation	2	
13. Multitasking and team management	1	Resource
14. Information technology	2	

TABLE 2. The Physician Tasks from the Model with a Systems-Based Practice (SBP) Value fo 1 with the Corresponding Subcompetencies

Physician Task	SBP Subcompetency
Out-of-hospital care	Accessing/utilizing resources, interfacing with delivery systems.
Modifying factors	Accessing/utilizing resources, interfacing with delivery systems, practicing cost-appropriate care, advocating for patients in the system.
Legal/professional issues	Interfacing with delivery systems, practicing cost-appropriate care, advocating for patients in the system.
Diagnostic studies	Accessing/utilizing resources, interfacing with delivery systems, practicing cost-appropriate care.
Consultation and disposition	Accessing/utilizing resources, interfacing with delivery systems, practicing cost-appropriate care, advocating for patients in the system.
Prevention and education	Accessing/utilizing resources, interfacing with delivery systems, advocating for patients in the system.
Multitasking and team management	Accessing/utilizing resources.

coworkers than to win the respect of their supervisor alone.”⁸ A questionnaire/survey with rating scales completed by out-of-hospital care providers, staff nurses, and resident peers could be utilized. This evaluation method may be particularly effective in assessing specific aspects of SBP, such as the residents’ ability to access and appropriately utilize resources, providers, and systems necessary to provide optimal emergency care. Further, it may strengthen relationships among those surveyed by giving opportunity for meaningful feedback. For example, questions to members of the ED nursing

staff might include: whether the resident is sensitive to the influence his or her actions have on others, develops a sense of teamwork among coworkers, understands each person’s role in the organization, encourages input from coworkers, and can perform multiple tasks with appropriate priority. The challenges for this form of evaluation include the creation of an effective survey instrument, integration of input, and confidentiality. It might be preferable to develop this feedback system as an “online” evaluation tool that permits confidential input.

Portfolios are a collection of material prepared by the resident that records and “reflects” on key events/achievements in the resident’s learning.^{7,9} The development of a portfolio product requires identification of learning needs, planning of learning based on those needs, utilization of appropriate resources to meet the need, and demonstration of learning.⁹ There are many benefits to portfolio-based learning, including the recognition of gaps in knowledge, promotion of independent learning, self-reflection, and establishment of a pattern for continuing lifelong learning. Reflection is a critical component of portfolio-based learning. The resident should consider questions such as: why he has chosen the topic as a learning need, what is expected to be learned through the investigation, how the objectives will be accomplished, and what will be learned. Program directors may or may not wish to standardize the assessment of a portfolio. Specific criteria for the types of written works for inclusion in the portfolio may be developed by each program, and evaluation of success may be based on the educational process or by the assessment of “mastery of expected learning.”⁷

Systems-Based Practice lends itself well to portfolio-based learning and assessment. A multitude of examples could be chosen by the resident

to demonstrate need (gaps), intended learning, achievement, and reflection. It is very important, should portfolio-based learning be chosen as a model for gaining knowledge, that the resident assume primary responsibility for recognition of insufficient knowledge and development of a plan for rectifying the insufficiency, along with reflection on the issues. Examples of different types of written works that may be included in a resident's portfolio are an administrative project, a scholarly project, and a patient care example. Understanding delivery systems and how to best utilize them may lead to profound improvements in patient care. An administrative project might be investigating delays in patient admissions, which may have a cascading effect, creating significant ED backups, breakdown in patient care, and frustration among caregivers. A resident who is particularly unhappy about this system may choose to investigate the current admission model and look at and develop a group of recommendations to implement a rapid admission process. There are so many systems now available to provide online medical information to practitioners that it can be difficult to determine which will provide the most information efficiently. A group of residents with a particular desire to improve the efficiency of obtaining this type of information could investigate and publish a methodology for accessing information as a scholarly project. This might include use of personal data assistants (PDAs), certain websites, etc. Acting as a patient advocate and facilitating the patient's advancement through the health care system can be daunting. A patient care example might be when a resident, who has particular interest in ensuring that the patient's continuing medical needs are met, decides to explore components of the system with the intention of making the system more accessible and comprehensible to both health care providers and patients.

Standardized oral examinations are routinely used in EM programs. The ACGME program requirements state that formal evaluation of each resident during training must include oral and written examinations. Examiners are trained to consistently present scenarios, evaluate responses, and score residents. Since the assessment tool already exists in EM programs, it would be simple to either modify cases, or modify the evaluation form used for scoring the exam, to include the SBP subcompetencies of:

1. Patient consultation/disposition—Resident competence in dealing with complicated consultation and disposition issues can be assessed

through an oral exam format. This could form the basis of further discussion and education.

2. Multitasking—Triple case encounters are classically used to assess the test taker's competence in prioritizing care. The oral exam format could be used for evaluating resident multitasking, though real-life ED case management would perhaps provide a better source for assessing this information.
3. Resource utilization and cost-appropriate care—The oral case examination format may help elucidate the "shotgun" approach of some residents to utilizing resources.

Written examinations (MCQ) are often used in training programs and can have great value in discerning resident knowledge base. Emergency medicine programs utilize the in-training examination to assess strengths and weaknesses of the program's curriculum and the residents' understanding. It is likely that the EM in-training examination will increasingly develop valid questions and provide feedback specific to the core competencies, including SBP.

Secondary Assessment Methodologies. While the following tools could in part be used to assess SBP, it was the sense of the Consensus Group that the primary assessment methodologies listed previously would be more effective.

- *Chart-stimulated recall oral examination (CSR)*—This is a variation of the standardized oral examination, in which the actual care provided by the resident examinee is explored. The evaluator inquires about the evaluation, including the clinical findings, laboratory assessment, medical decision making, treatment, or any of the other related physician tasks. The resident is evaluated on the basis of following established management protocols.
- *Objective structured clinical examination (OSCE)*—Similar to skill stations used in an Advanced Cardiac Life Support (ACLS) or Advanced Trauma Life Support (ATLS) course, OSCEs are standardized patient encounter stations. All residents complete each encounter. This assessment methodology is commonly used for assessment of resident competency in patient evaluation and management. Certain aspects of SBP could be evaluated by this method, but the complexities of the tasks lend themselves less well to simulation.
- *Patient surveys (PSQ)*—Patient surveys have great value in the determination of communication skills and perception of overall ED effi-

ciency. This tool has limited value for assessment of the SBP competency. It could be helpful in determining the resident's efforts toward patient advocacy, if patients recognized that the resident facilitated their advancement through the system. However, this would be resource-intensive and not specific for the resident's actual performance, as patients' perceptions of their experiences are subjective and multi-factorial.

APPLICATION TO RESIDENCY TRAINING IN EM

While SBP objectives may appear rather abstract, once defined by the CORD-EM Consensus Group they translate easily into daily EM practice by using simple case examples to analyze the systems involved. These case examples are presented below, with the Model cross-referenced, and suggestions of how the specific objectives could be taught in an EM residency program.

Case 1. The EM resident is on base-station-duty. He has to direct the care of a critically ill patient. In addition, he has to make a decision regarding to which hospital to direct EMS according to the local diversion policies.

Systems involved. In order to "understand, access, appropriately utilize, and evaluate the effectiveness of the resources, providers, and systems necessary to provide optimal emergency care," the EM resident must have knowledge of:

1. Patient care-related systems: EMS and out-of-hospital care systems; multitasking; resource utilization; family-related issues; diagnostic and therapeutic modalities.
2. Institution-related systems: Hierarchical command structures; staffing, other hospital-related resources.
3. Technology systems: Transportation systems and their impact on patient care; communication systems.
4. Regulatory agencies: EMTALA regulations; regional and local hospital designations; diversion policies, and other local or regional laws.

Model of Clinical Practice physician tasks utilized. Out-of-hospital care; diagnostic studies; professional and legal issues; consultation and disposition; multitasking and team management; information technology.

Suggested residency curriculum components. EMS rotation with base-station responsibility; required reading; committee participation; lectures; EMS

continuous quality improvement (CQI); ATLS participation; disaster committees.

Case 2. A terminally ill cancer patient is brought to the ED with shortness of breath due to progression of his lung metastases. His family wants everything to be done but the patient just wants to "die in peace."

Systems involved. In order to "understand different medical practice models and delivery systems and how to best utilize them to care for the individual patient," knowledge of the following systems is required:

1. Patient-related: Family, home, social support systems; treatment and disposition of terminally ill patients and their alternatives; cultural and societal expectations.
2. Institution-related: Legal and ethical systems; regulatory agencies; regional do-not-resuscitate (DNR) regulations; practice guidelines.

Model of Clinical Practice physician tasks utilized. Modifying factors; professional and legal issues; diagnostic studies; therapeutic interventions; pharmacotherapy; prevention and education.

Suggested residency curriculum components. Debate groups; evidenced-based medicine; interdisciplinary conferences; literature debate about ethical issues; end-of-life lectures, videos; ethics committee involvement; case follow-up studies.

Case 3. An indigent, insulin-dependent, diabetic patient uses the ED for primary care issues and medication refill.

Systems involved. In order to "practice cost effective health care and resource allocation that does not compromise quality of care," EM physicians must be aware of the following systems:

1. Patient-related: Insurance/reimbursement-related; family/home/support systems; patient education systems; health care access; cultural issues.
2. Institution related: Admission guidelines; referral systems; clinic/outpatient systems; pharmacy and refill procedures.
3. Technology systems: Electronic charting and communication with primary health care providers; clinic scheduling and reimbursement systems, and their limitations.
4. Regulatory agencies: Medicaid/Medicare issues; EMTALA regulations.

Model of Clinical Practice physician tasks utilized. Modifying factors; consultations and disposition;

prevention and education; multitasking and team management; information technology.

Suggested residency curriculum components. Interdisciplinary conferences; institutional CQI involvement; community outreach programs; lectures and workshops; internal medicine/clinic rotation; case follow-up studies.

Case 4. A patient is diagnosed in the ED with a possible work-related malignancy. An extensive, multidisciplinary outpatient workup is required. The patient is sole provider for his family and does not have many sick days left.

Systems involved. A case such as this requires the EM physician to "advocate for and facilitate patient's advancement through the health care system." This can be accomplished only with a solid understanding of the following systems:

1. Patient-related: Family/home/support systems; insurance systems; work environments; child care, school and child support systems.
2. Institution-related: Triage guidelines; consultation staff roster; clinic and outpatient department systems; admission guidelines; laboratory and other diagnostics; treatment options available.
3. Technology systems: Internet-based resources; communication systems.
4. Regulatory agencies: Regional/national organizations; DNR and living will regulations; work safety regulations.

Model of Clinical Practice physician tasks utilized. Modifying factors; professional and legal issues; diagnostic studies; consultation and disposition; prevention and education; multitasking and team management; information technology.

Suggested residency curriculum components. Lectures; CQI; patient follow-up studies; interdepartmental conferences; case conferences.

CONCLUSIONS/RECOMMENDATIONS

1. The four subcompetencies of SBP are already reflected as core topics in EM residency curricula, including understanding resources, providers, and systems, cost-appropriate care, delivery systems, and patient advocacy.
2. The challenge is to unbundle the physician tasks relevant to SBP so that they may be separately assessed. The primary assessment tools for SBP are:
 - Direct observation
 - Global ratings

- 360-degree evaluations
- Portfolio assessments
- Testing: oral and written

3. The suggested curriculum components for incorporating SBP into an EM residency are all already in place in most programs, so little additional expense is required for implementation. The primary curricular components for teaching SBP are:

- Out-of-hospital care rotation
- Administrative rotation/responsibilities
- Internal medicine rotation
- Conferences: interdisciplinary, case, follow-up, core curriculum, and grand rounds
- Committee participation: hospital-based, CQI, etc.

References

1. ACGME Outcome Project. Website: www.acgme.org/outcome. 2001.
2. Nolan TW. Understanding medical systems. *Ann Intern Med*. 1998; 128:293–8.
3. Berwick DM, Nolan TW. Physicians as leaders in improving health care: a new series in *Annals of Internal Medicine*. *Ann Intern Med*. 1998; 128:289–92.
4. Yedidia MJ, Gillespie CC, Moore GT. Significant clinical competencies for managed care. *JAMA*. 2000; 284:1093–8.
5. Adapted from ACGME paper—Assessment: Key Considerations for Selecting Assessment Instruments and Implementing Assessment Systems. Chicago, IL: ACGME, 2001.
6. Hockberger RS, Binder LS, Graber MA, et al. The model of the clinical practice of emergency medicine. *Ann Emerg Med*. 2001; 37:745–70.
7. ACGME and ABMS. A product of the joint initiative of the ACGME Outcome Project of the Accreditation Council for Graduate Medical Education (ACGME), and the American Board of Medical Specialties (ABMS). Version 1.1, Sept 2000.
8. Edwards ME, Ewen AJ. 360 Degree Feedback. New York: American Management Association, 1996.
9. Portfolios. Website: www.abersychan.demon.co.uk/cpd/fintro.htm. Feb 2000.
10. McMillan JH. *Essential Assessment Concepts for Teachers and Administrators*. Thousand Oaks, CA: Corwin Press, 2001.

Appendix A. Definitions of Characteristics of an Assessment Tool

Validity. A valid assessment tool should demonstrate a causal relationship between the intervention and the accomplishment of the objective. In other words, one can infer validity from a tool when the desired outcome has or has not been accomplished. If successful completion of an Advanced Trauma Life Support (ATLS) course leads to improved performance during trauma resuscitation, it could be inferred that the assessment of successful completion was valid. "Strong validity is demonstrated when evidence and logic suggest that the evaluation is accurate and reasonable."¹⁰

Reliability. Reliability, stated simply, is dependability and consistency. That is, a measurement that is reliable yields con-

sistent results often stated in terms of a correlation coefficient approaching 1.0. Test scores may be determined to be reliable if the test, when given more than once without intervention, produces results that are similar or the same (test-retest reliability). An assessment is considered to have interrater reliability when multiple observers give similar scores to the same activity.

Fairness. While there are many definitions of fairness in the education literature, an assessment may be considered fair when it lacks bias.¹⁰ To be fair, an assessment must not be affected by irrelevant factors (gender, race, economic), subjective factors (bias of the scorer), or any factor that provides a student an unrelated advantage or disadvantage.

Feasibility. For an assessment to be feasible it must be accomplishable without unduly taxing resources. Those resources might include faculty time, resident time, equipment, expense, etc.

Appendix B. Sample Questions for Resident Competency Evaluation of Specific Physician Tasks from the Model of the Clinical Practice of Emergency Medicine

Out-of-hospital care:

- Does the resident understand the capacities and limitations of the out-of-hospital care provider?
- Does the resident recognize and appropriately apply his or her knowledge to the legal and regulatory issues of out-of-hospital care, i.e., Emergency Medical Treatment and Labor Act (EMTALA), diversion and bypass, consent, and refusal of care?
- Does the resident participate actively in out-of-hospital care, providing online or offline medical direction, or interact with out-of-hospital medical providers?

Modifying factors:

- Does the resident understand how age, gender, ethnicity, barriers to communication, socioeconomic status, underlying disease, and other factors affect patient management?
- Does the resident mobilize appropriate resources to overcome barriers and improve patient care?

Legal/professional issues:

- Does the resident understand EMTALA and effectively apply his or her understanding to patient transfer?
- Does the resident understand risk management and malpractice and apply this understanding to limit risk to the patient?
- Does the resident appropriately apply an understanding of the following issues to patient care: Capacity and consent, confidentiality and reporting, leaving against medical advice (AMA) and refusal of care, and telephone advice?

Diagnostic studies:

- Does the resident understand the components of obtaining diagnostic imaging and laboratory studies and their affect on patient care efficiency?
- Can the resident apply this knowledge to enhance the efficiency of patient care?

Consultation and disposition:

- Does the resident provide effective patient disposition, formulating and implementing appropriate follow-up?
- Does the resident appropriately collaborate with and use consultants?
- Does the resident understand how to utilize admission criteria?

Prevention and education:

- Does the resident consistently teach the patient (family) to use the system to the patient's benefit?
- Does the resident understand how to improve patient compliance?
- Does the resident apply epidemiological information to patients at risk?

Multitasking and team management:

- Can the resident effectively lead/supervise members of the team?
- Can the resident simultaneously and efficiently manage several patients?
- Does the resident prioritize multiple patients in order to provide optimal care?
- Does the resident demonstrate appropriate use of resources during a disaster?