

Curriculum of the American College of Phlebology

T Nguyen*, **J Bergan†**, **R Min**, **N Morrison§** and **S Zimmet****

*Dermatology, Mohs Micrographic & Dermatologic surgery, Procedural Dermatology, University of Texas-MD Anderson Cancer Center, Houston, TX, USA; †Department of Surgery, UCSD School of Medicine, San Diego, CA, USA; ‡Department of Radiology, Cornell University School of Medicine, New York, NY, USA; §Morrison Vein Institute, Scottsdale AZ, USA; **Zimmet Vein and Dermatology, Austin, TX, USA

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In 2005, at the request of the American College of Phlebology (ACP), the American Medical Association designated Phlebology as a recognized specialty. The Board of Directors of the ACP immediately realized that training in Phlebology and certification would follow. Appropriate committees were named so that free-standing, academic and Preceptorship programmes could be developed.

Definition of the content of Phlebology training programmes became the next priority. What follows is the first statement, which describes what is adequate in the educational programme that will qualify a physician to become a phlebologist. Bergan supplied the template and Nguyen expanded and refined the content. Others, named above, contributed to the statement that follows.

*Correspondence: **Professor J Bergan MD FACS FRCS Hon. (Eng)**, Department of Surgery, UCSD School of Medicine, San Diego, CA, USA.
Email: jbergan@ucsd.edu

Fundamental principles						
Goals and objectives	Resources (see selected textbooks and bibliography)	Suggested learning activities	Knowledge	Clinical experience	Recommended proficiency interval (quarter)	Suggested assessment methods
(1) Normal venous anatomy of superficial, deep and perforating veins of the lower extremities including the great saphenous vein (GSV), saphenofemoral junction, small saphenous vein (SSV), popliteal fossa and the femoral, popliteal and tibial vessels		Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Computer modules Anatomic or animal models Textbook readings	X		1	Clinical performance ratings Focused observation and evaluation Role play or simulations Formal oral exam Anatomic or animal models
(2) Anatomy of pelvic and ovarian veins		Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Computer modules Anatomic or animal models Role playing or simulations Textbook readings	X		1	Clinical performance ratings Focused observation and evaluation Role play or simulations Anatomic or animal models
(3) Anatomy of adjacent and accompanying structures such as arteries, nerves and lymphatics		Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Textbook readings	X		1	Clinical performance ratings Focused observation and evaluation stimulated chart recall
(4) Normal venous haemodynamics and the derangements associated with chronic venous insufficiency with their varied clinical presentations.		Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Textbook readings	X		1	Clinical performance ratings Focused observation and evaluation Stimulated chart recall
(5) Venous disease (a) Epidemiology (b) Presentation (c) Morbidity (d) Deep versus superficial		Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Textbook readings	X		2	Clinical performance ratings Focused observation and evaluation Role play or simulations Stimulated chart recall Anatomic or animal models Clinical performance ratings Focused observation and evaluation Stimulated chart recall
(6) Understand the basic science of venous pathophysiology, i.e. function of normal venous endothelium and its alteration in chronic venous insufficiency (e.g. production of prostacyclin, plasminogen activator, heparans and thrombomodulin). This includes the role of the inflammatory cascade in the development of valvular damage, remodeling and lipodermatosclerosis		Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Textbook readings	X		1	Clinical performance ratings Focused observation and evaluation Stimulated chart recall

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Fundamental principles						
Goals and objectives	Resources (see selected textbooks and bibliography)	Suggested learning activities	Knowledge	Clinical experience	Recommended proficiency interval (quarter)	Suggested assessment methods
(7) To understand the general principles (indications, contraindications, risks and benefit) of therapy (medical and surgical) for venous disease		Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Textbook readings	X		2	Clinical performance ratings Focused observation and evaluation Role play or simulations Stimulated chart recall
(8) Understand the evaluation and management of recurrence following surgery		Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Textbook readings	X		3	Clinical performance ratings Focused observation and evaluation Role play or simulations Stimulated chart recall
(9) Cutaneous disease associated with venous insufficiency (a) To understand the characteristics of venous ulcers and be able to differentiate these from other types of ulcers including arterial, neuropathic, malignant, infectious and inflammatory (b) To be able to differentiate venous dermatitis (stasis dermatitis, atrophie blanche, lipodermatosclerosis) from other skin conditions (i.e. vasculitis, pyoderma gangrenosum, capillaritis, disseminated superficial actinic keratosis, etc.) of the lower extremities		Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Textbook readings	X		2	Clinical performance ratings Focused observation and evaluation Role play or simulations Stimulated chart recall
(10) Lower extremity venous thrombosis (a) Major risk factors, including acquired and hereditary hypercoagulable conditions (b) Thrombotic impact on normal venous patency and valvular function (c) The relationship between acute deep vein thrombosis and the eventual development of chronic venous insufficiency		Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Textbook readings	X		2	Clinical performance ratings Focused observation and evaluation Role play or simulations Stimulated chart recall

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Fundamental principles

Goals and objectives	Resources (see selected textbooks and bibliography)	Suggested learning activities	Knowledge	Clinical experience	Recommended proficiency interval (quarter)	Suggested assessment methods
(d) Post-thrombotic versus postphlebitic						
(e) Superficial thrombophlebitis, deep venous thrombosis and pulmonary embolism						
(11) Understand the presentation, diagnosis and management (medical and surgical) of primary and secondary subclavian/axillary vein thrombosis		Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Individual or group projects Textbook readings	X		3	Clinical performance ratings Focused observation and evaluation Stimulated chart recall Review of patient chart/record Review of patient outcomes
(12) To understand and differentiate the three aetiologic categories of venous dysfunction: Congenital, primary and secondary (post-thrombotic or post-traumatic)		Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Individual or group projects Textbook readings	X		1	Clinical performance ratings Focused observation and evaluation Standardized patient Review of case or procedure log Review of patient chart/record
(13) Understand the lymphatic system and the pathophysiology of its dysfunction		Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Textbook readings	X		1	Clinical performance ratings Focused observation and evaluation Standardized patient Review of case or procedure log Review of patient chart/record
(14) Definitions and implications of:						
(a) Ambulatory venous hypertension						
(b) Atrophie blanche						
(c) Chronic venous disorder						
(d) Chronic venous insufficiency						
(e) Klippel-Trenaunay, syndrome						
(f) Lipedema						
(g) Lipodermatosclerosis						
(h) Lymphedema						
(i) May-Thurner Syndrome						
(j) Parks-Weber Syndrome						
(k) Pelvic venous congestion						
(l) Perforating veins						
(m) Phlegmasia alba dolens						
(n) Phlegmasia cerulea dolens						
(o) Reticular veins						

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Fundamental principles						
Goals and objectives	Resources (see selected textbooks and bibliography)	Suggested learning activities	Knowledge	Clinical experience	Recommended proficiency interval (quarter)	Suggested assessment methods
(p) Sclerotherapy (q) Telangiectasia (r) Varicose veins (s) Venous claudication (t) Virchow's triad						
Diagnostic evaluation						
Goals and objectives	Resources (see selected textbooks and bibliography)	Suggested learning activities	Knowledge	Clinical experience	Recommended proficiency interval	Suggested assessment methods
(1) To properly perform a focused history and physical examination on the patient with venous disease		Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Standardized patient Individual or group projects Textbook readings	X	X	2	Clinical performance ratings Focused observation and evaluation
(2) To understand, perform, interpret and document non-invasive evaluations for lower extremity reflux testing (diagnosis of superficial, perforator, deep or combined venous insufficiency) and for deep venous thrombosis. Specifically, proficiency in these methods is expected: (a) Manual Doppler exam (b) Duplex, ultrasonography (c) Photoplethysmography (d) Ankle-brachial index		Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Individual or group projects Textbook readings	X	X	3	Clinical performance ratings Focused observation and evaluation Stimulated chart recall Review of patient chart/record Review of patient outcomes
(3) Understand methods used to evaluate venous/lymphatic malformations, pelvic venous congestion and venous obstruction		Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Individual or group projects Textbook readings	X		4	Clinical performance ratings Focused observation and evaluation Stimulated chart recall Review of patient chart/record Review of patient outcomes

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Diagnostic evaluation

Goals and objectives	Resources (see selected textbooks and bibliography)	Diagnostic evaluation				Suggested assessment methods
		Suggested learning activities	Knowledge	Clinical experience	Recommended proficiency interval	
(4) Understand the role for other imaging modalities such as; magnetic resonance (MR) angiography, computed tomography (CT) angiography, venography		Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Individual or group projects Textbook readings	X		4	Clinical performance ratings Focused observation and evaluation Stimulated chart recall Review of patient chart/record Review of patient outcomes
(5) To understand the use of transillumination and infrared imaging for mapping of reticular and/or varicose veins		Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Standardized patients Individual or group projects Textbook readings	X	X	2	Clinical performance ratings Focused observation and evaluation Stimulated chart recall Review of patient chart/record Review of patient outcomes
(6) To understand the indication for peripheral arterial system evaluation and what diagnostic studies are available		Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Institutional conferences, lectures or discussions Individual or group projects Textbook readings	X		1	Clinical performance ratings Focused observation and evaluation Stimulated chart recall Review of patient chart/record
(7) To understand and utilize the updated CEAP classification (<i>J Vasc Surg</i> 2004 Dec; 40 (6):1248-52) of venous insufficiency in the integration of clinical and radiologic findings		Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Institutional conferences, lectures or discussions Individual or group projects Textbook readings	X	X	4	Clinical performance ratings Focused observation and evaluation Stimulated chart recall Review of patient chart/record
(8) Evaluation of hypercoagulable states		Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Institutional conferences, lectures or discussions Individual or group projects Textbook readings	X	X	4	Clinical performance ratings Focused observation and evaluation Stimulated chart recall Review of patient chart/record

		Treatment				
Goals and objectives	Resources (see selected textbooks and bibliography)	Suggested learning activities	Knowledge	Clinical experience	Recommended proficiency interval	Suggested assessment methods
(1) Medical therapy including pharmacologic agents, hyperbaric oxygen, antibiotics, skin substitutes and topical wound care products and growth factors		Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Individual or group projects Textbook readings	X	X	3	Clinical performance ratings Focused observation and evaluation Stimulated chart recall Review of patient chart/record Review of patient outcomes
(2) Compression therapy (bandaging systems and stockings)		Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Standardized patient Individual or group projects Textbook readings	X	X	3	Clinical performance ratings Focused observation and evaluation
(3) Anaesthesia techniques related to venous therapy including local and tumescent anaesthesia, axiolytic		Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Individual or group projects Textbook readings	X	X	2	Clinical performance ratings Focused observation and evaluation
(4) Visual sclerotherapy (liquid and foam variations)		Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Standardized patient Individual or group projects Textbook readings	X	X	3	Clinical performance ratings Focused observation and evaluation
(5) Duplex-guided sclerotherapy		Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Standardized patient Individual or group projects Textbook readings	X	X	3	Clinical performance ratings Focused observation and evaluation
(6) Ambulatory phlebectomy		Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Standardized patient Individual or group projects Textbook readings	X	X	3	Clinical performance ratings Focused observation and evaluation Stimulated chart recall

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Goals and objectives	Resources (see selected textbooks and bibliography)	Treatment				Suggested assessment methods
		Suggested learning activities	Knowledge	Clinical experience	Recommended proficiency interval	
(7) Endovenous ablation (i.e. endovenous laser; endovenous radiofrequency; endovenous chemical ablation, catheter based therapy)	Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Textbook readings	X	X	X	3	Clinical performance ratings Focused observation and evaluation Stimulated chart recall
(8) Cutaneous laser surgery and its role in the treatment of telangiectasias and reticular veins	Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Textbook readings	X			3	Clinical performance ratings Focused observation and evaluation Stimulated chart recall
(9) The fellow should have knowledge of vein stripping and perforator surgery and their respective roles in venous therapy	Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Textbook readings	X			3	Clinical performance ratings Focused observation and evaluation
(10) The fellow should have knowledge of the management of pelvic venous insufficiency	Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Textbook readings	X			4	Clinical performance ratings Focused observation and evaluation Stimulated chart recall Review of patient chart/record Review of patient outcomes Clinical performance ratings Focused observation and evaluation Stimulated chart recall
(11) Understand the principles in managing venous/lymphatic malformations and anomalies	Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Textbook readings	X			4	Clinical performance ratings Focused observation and evaluation Stimulated chart recall Review of patient chart/record Review of patient outcomes Clinical performance ratings Focused observation and evaluation Stimulated chart recall
(12) To be able to describe the procedures used for treatment of deep venous reflux and/or obstruction including valvoplasty, vein and valve transplantation and vein segment transposition	Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Textbook readings	X			4	Clinical performance ratings Focused observation and evaluation
(13) Recognize and manage perioperative complications related to venous procedures such as pain, phlebitis, haematoma, infection, allergic reactions, thromboembolism, ulceration, events associated with foam sclerotherapy	Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Individual or group projects Textbook readings	X	X	X	3	Clinical performance ratings Focused observation and evaluation Stimulated chart recall Review of patient chart/record Review of patient outcomes

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		Treatment				
	Resources (see selected textbooks and bibliography)	Suggested learning activities	Knowledge	Clinical experience	Recommended proficiency interval	Suggested assessment methods
(14)	Recognize the indications for consultation and referral to other specialists, especially in the event of intra-arterial injections and venous thrombosis	Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Individual or group projects Textbook readings	X		3	Clinical performance ratings Focused observation and evaluation Stimulated chart recall Review of patient chart/record Review of patient outcomes
Adjunctive education						
	Resources (see selected textbooks and bibliography)	Suggested learning activities	Knowledge	Clinical experience	Recommended proficiency interval	Suggested assessment methods
(1)	Ethics training	Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Institutional conferences, lectures or discussions Standardized patient Individual or group projects Textbook readings Role modelling Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Individual or group projects Textbook readings	X		3	Clinical performance ratings Focused observation and evaluation Standardized patient Review of case or procedure log Review of patient chart/record 360 Degree assessment
(2)	Vascular laboratory development		X		4	Clinical performance ratings Focused observation and evaluation Standardized patient Review of case or procedure log Review of patient chart/record
(3)	Documentation and billing for venous disease	Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Individual or group projects Textbook readings	X	X	4	Clinical performance ratings Focused observation and evaluation Stimulated chart recall Review of patient chart/record

(Continued.)

Adjunctive education

Goals and objectives	Resources (see selected textbooks and bibliography)	Adjunctive education				Suggested assessment methods
		Suggested learning activities	Knowledge	Clinical experience	Recommended proficiency interval	
(4) Basic and advanced cardiac life support		Certification course High-tech simulators/ simulations Departmental conferences, lectures or discussions Computer models Role playing or Simulations Textbook readings Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Institutional conferences, lectures or discussions Individual or group projects Textbook readings Clinical teaching Clinical experiences	X	X	1	Formal oral exam Stimulated chart recall In training examination
(5) Quality assurance (QA) process		Departmental conferences, lectures or discussions Institutional conferences, lectures or discussions Individual or group projects Textbook readings Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Institutional conferences, lectures or discussions Individual or group projects Textbook readings Clinical teaching Clinical experiences	X	X	4	Clinical performance ratings Focused observation and evaluation Stimulated chart recall Review of patient chart/record Review of patient outcomes
(6) Quality improvement (QI) programme		Departmental conferences, lectures or discussions Institutional conferences, lectures or discussions Individual or group projects Textbook readings Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Institutional conferences, lectures or discussions Individual or group projects Textbook readings Clinical teaching Clinical experiences	X	X	4	Clinical performance ratings Focused observation and evaluation Stimulated chart recall Review of patient chart/record Review of patient outcomes
(7) Research design and analysis		Departmental conferences, lectures or discussions Institutional conferences, lectures or discussions Individual or group projects Textbook readings Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Institutional conferences, lectures or discussions Individual or group projects Textbook readings Clinical teaching Clinical experiences	X	X	2	Clinical performance ratings Focused observation and evaluation Stimulated chart recall Review of patient chart/record Review of patient outcomes
(8) Quality of life (QoL) indicators as related to venous disease; venous clinical severity score, venous disability score, venous segmental disease score, as well as general and venous-specific QoL scales		Departmental conferences, lectures or discussions Individual or group projects Textbook readings Clinical teaching Clinical experiences Departmental conferences, lectures or discussions Institutional conferences, lectures or discussions Individual or group projects Textbook readings Clinical teaching Clinical experiences	X		4	Clinical performance ratings Focused observation and evaluation Stimulated chart recall Review of patient chart/record Review of patient outcomes

Instructional methods

- (1) *Clinical teaching* – teaching that occurs in the clinic, EDs, ORs, laboratories or other medical settings and addresses issues related to residents' current patient cases or clinical responsibilities.
- (2) *Clinical experiences* – direct, hands-on clinical or patient care activities. This may include surgical and non-surgical treatment, patient exams, and diagnostic assessment with ultrasound.
- (3) *Performance feedback* – information provided to a resident that describes what (s)he has done well or poorly and provides specific guidance as to how performance might be improved.
- (4) *Departmental conferences, lectures or discussions* – formal, classroom instruction on a specific topic or method, led by one or more faculty, residents or staff, etc.
- (5) *Institutional conferences, lectures, or discussions* – formal educational event involving institution-sponsored grand rounds, lectures, discussions or workshops for residents and/or faculty from multiple specialties; may be part of an institutional core curriculum (i.e. a set or course of learning activities arranged to impart knowledge and skills in fundamental domains, for example, communication skills, legal issues, ethics).
- (6) *Individual or group projects* – multi-step, multi-component tasks performed as vehicles for learning and applying knowledge and skills. Projects should result in a product. Examples are literature reviews, research, clinical quality improvement projects and community health advocacy work.
- (7) *Computer modules* – computer-based instructional units that present medical knowledge or clinical tasks, etc., that residents work through independently. These modules are developed either by the institution/programme or purchased from commercial vendors.
- (8) *Standardized patients* – professional actors or real patients trained to present realistically and reliably a medical condition and/or specific patient behaviours; the standardized patient provides instruction to the resident or feedback about his/her performance.
- (9) *High-tech simulators/simulations* – three-dimensional, high-tech, computerized devices that represent human anatomy and physiological responses (simulators) are used

by residents to learn procedures and operations. Or realistic patient care scenarios are generated using high-tech/virtual reality devices (simulations). Residents engage in the scenario as in real life to learn or apply clinical or teamwork skills.

- (10) *Anatomic or animal models* – non-computerized, three-dimensional devices that replicate the properties of human anatomical structures are used by residents to learn procedures.
- (11) *Role play or simulations* – staged replicas of potentially real situations are engaged in by residents to learn, practice or rehearse skills needed in those situations. This method is often used in difficult or high-risk situations, e.g. mobilization of a medical team in a multi-victim accident or confrontation of an 'impaired' colleague.
- (12) *Games* – informal activities with goals, rules, rewards and penalties for various courses of action. Games may be computerized, played individually or in groups, facilitated or self-paced.
- (13) *Role modelling* – portrayal of desired professional behaviours, communication skills, or clinical skills etc. by attending/supervising physician with the expectation that residents will learn these behaviours and skills by observing the role models.

Assessment methods

- (1) *Clinical performance ratings* – monthly, rotation, semi-annual or annual ratings of resident performance.
- (2) *Focused observation and evaluation* – supervisor/attending observation of individual resident-patient encounters, operations, specimen preparation, etc., and concurrent (same day) evaluation.
- (3) *360 assessments* – evaluation by MDs (supervisors, residents, medical students) and non-MDs (nurses, technicians, social workers, PAs) using the same or similar evaluation forms.
- (4) *Evaluation committee* – evaluation of resident performance in a small group discussion format, e.g., Evaluation Committee.
- (5) *Structured case discussions* – an informal structured mini-oral exam consisting of a small set of predetermined questions; the exam occurs during a resident's case presentation to his/her supervisor.

- (6) *Stimulated chart recall* – uses a resident's patient records in an oral exam-like format to explore decisions made and patient management; is conducted 'after the fact' using patient charts to stimulate memory of the case.
- (7) *Standardized patient (SP)* – the resident provides care to an SP as if (s)he were a real patient and is evaluated concurrently by the SP or another trained observer; the SP is a well person or actual patient trained to present a case in a standardized way.
- (8) *Onservice clinical exam (OSCE)* – a multi-station exam of simulated clinical tasks, which might include SPs, anatomical models, X-ray interpretation, lab test interpretation, etc.; a resident performs the tasks and is evaluated concurrently by a trained observer.
- (9) *High-tech simulators/simulations* – residents' performance of procedures on a high-tech simulator (e.g., Harvey) is evaluated; *this may involve built-in evaluation by the simulator or observation and concurrent evaluation.*
- (10) *Anatomic or animal models* – residents' performance of procedures on non-computerized, three-dimensional models that replicate the properties of human anatomical structures is observed and evaluated concurrently.
- (11) *Role-play or simulations* – residents are evaluated based on their performance on assigned responsibilities in a staged replica of a potentially real situation, e.g., mobilization of medical team in a multi-victim accident, confrontation of an 'impaired' colleague, negotiation with administration regarding facilities and equipment upgrade.
- (12) *Formal oral exam* – 'mock' oral exam in which an examiner asks residents questions about what to do in a clinical scenario presented verbally or role played by the examiner.
- (13) *In-training exams* – a multiple-choice exam developed by an external vendor.
- (14) *In-house written exams* – a multiple choice exam developed by residency programme faculty.
- (15) *Multimedia exam* – a computer-based multiple choice or branching question exam in which authentic visual and auditory patient information is presented as question information.
- (16) *Practice/Billing audit* – educational equivalent of physician profiling; this data-based process benchmarks individual resident billing data against peers in the office, hospital or managed care setting.
- (17) *Review of case or procedure log* – review of number of cases or procedures performed and comparison against minimum numbers required.
- (18) *Review of patient chart/record* – involves abstraction of information from patient records, such as tests ordered, and comparison of findings against accepted patient care standards.
- (19) *Review of patient outcomes* – aggregation of outcomes of patients cared for by a resident and compared against a standard.
- (20) *Review of drug prescribing* – systematic review of drug prescribing for selected conditions to determine adherence to protocol.
- (21) *Resident project report (portfolio)* – evaluation of resident work products, such as reports of research studies, practice improvement, or systems-based improvement.
- (22) *Resident experience narrative (portfolio)* – evaluation of performance based on residents' narratives of critical incidences or other experiences, usually accompanied by reflection on the event, e.g., what happened, why, what could have been done differently?
- (23) *Other portfolio* – evaluation of resident performance based on other work/performance products not included above, e.g., audiotapes, slide presentations.

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