

Systems-Based Practice and Anesthesiology Residency: Report from the SEA Task Force on the ACGME Core Competencies

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Abstract:

Background: The Accreditation Council for Graduate Medical Education requires that residents be educated in six general core competencies, but has relied on individual specialties to develop their own definitions, teaching methods and evaluative tools. The Society for Education in Anesthesia took the initiative by organizing a two-day conference to accomplish these goals.

Methods: Facilitated by four anesthesia educators, anesthesiologists from diverse programs and backgrounds employed open systems theory to better define System-Based Practice and outline key examples specific for anesthesiology.

Results: Pre-operative assessment, intraoperative management, inter-disciplinary pain management team, and healthcare facility interactions were selected as forums where observable activities, educational goals and practical assessment tools universal enough to be applicable to most anesthesiology training programs can be developed.

Conclusions: The application of open systems theory in the setting of small focus groups proved successful by producing definitions, teaching methods and evaluative tools for SBP. The diversity of the groups should allow the products to have flexibility and widespread use.

Introduction:

In 1999, the Accreditation Council for Graduate Medical Education (ACGME) endorsed six general core competencies for residency training: 1) medical knowledge, 2) patient care, 3) professionalism, 4) interpersonal and communication skills, 5) practice-based learning and improvement, and 6) systems-based practice (1). A number of techniques for the evaluation of these competencies were later suggested and introduced in the form of the ACGME Toolbox Assessment Methods[©] (2). The definition, teaching methods and means of assessment for each core competency were anticipated to be a collaborative endeavor between the ACGME and each medical specialty. In 2003, the Society for Education in Anesthesia (SEA) established a presidential task force to study the implication of the core competencies for training in anesthesiology. The Task Force sought to establish a broad and inclusive plan for the education and evaluation of anesthesiology residents according to the ACGME core competencies, by gathering together anesthesiologists from a variety of programs across the USA.

For many physicians and educators, Systems Based Practice (SBP) creates the greatest degree of uncertainty and largest number of questions. The following report contains the Task Force's findings and conclusions in the realm of SBP.

Methods and Materials:

The Task Force nominated 2 - 4 anesthesiology educators to lead the development of each core competency. These individuals undertook an extensive review of the literature and prepared material for presentation and discussion at the 2004 Annual SEA Spring Meeting. The Task Force designed six focus group sessions to explore, discuss and, eventually, map out opportunities in anesthesiology to address each competency. 160 attendees were divided into three groups to address each of the ACGME core competencies.

Four co-facilitators were assigned to the SBP competency. These individuals defined specific goals and learning objectives (Table 2) from an extensive review of literature concerning SBP in anesthesia and other medical specialties. The facilitators also prepared brief presentations, and led four small subgroups, which went on to further explore SBP in anesthesiology. Open systems theory (3, 4) was introduced to the group as a method to define and better understand SBP and its application to anesthesiology. (Figure 1)

General system theory focuses on the relationships, structures, and interdependence of interdependent components as opposed to viewing an entity as a whole. For example an anesthetized patient can be viewed as a complex interaction of organs, medications, fluids and gasses or simply as a nonmoving body lying on an OR table. Open systems theory views the system in relationship to its environment by identifying its interdependent components and their effect on each other and repeated cycles of inputs, process, and output. In these terms, an operating room's input is the patient, the surgical supplies and anesthetics; the process is anesthesia and surgery; and the output is a stable, comfortable patient with a surgical correction. The physicians, nurses, support staff and equipment are all interacting and interdependent components of this system. When an anesthesiology resident's role is viewed in terms of open systems theory, the elements of SBP are easily identified. A resident's interaction with any of the components within a health facility and its effect on outcome (patient care) is a readily available and assessable aspect of SBP. This methodology was then used to find practical and accurate methods of evaluating performance.

The desired outcome of the group discussion was to outline four areas in which SBP could be observed, taught and evaluated during anesthesia residency training. The American Associations of Medical Schools' TACTICS (Teamwork, Advocacy, Coordination, Technology, Improvement, Cost-effectiveness, Safety), approach to SBP (5), was used as a framework for discussions. Decisions were achieved by consensus. Subgroups reported their findings to the main focus group generating questions and further

discussion. These findings were then summarized and presented to the whole meeting for final comments and questions.

After the annual meeting, the four SBP group facilitators collated and organized each subgroup's work. Ideas, which were initiated during the subgroup activities, were further developed by electronic mail with continued involvement of work session attendees. The completed report was submitted to the SEA Task Force for review and further development.

Results:

Thirty-three anesthesiologists representing 28 programs from 21 different states attended the work session on SBP. The group included 14 residency program directors, 6 fellowship directors and 1 department chair.

Through the lens of open systems theory a working definition of SBP was achieved: SBP was defined as: *The practice of anesthesia that takes into account the inter-related role of all the practitioners and the health care organizations involved in the care of the individual patient.* With the anesthesia resident as the focus, multiple educational and evaluative scenarios were identified. These are summarized in Figure 2. From this discussion, four areas of anesthesia practice were selected for further exploration. They included: 1) preoperative assessment, 2) intra-operative management, 3) multidisciplinary pain team, and 4) healthcare facility interactions. As investigation proceeded, ways in which SBP were already assessed by anesthesiology residencies became evident.

For each area, observable activities, educational goals, and assessment tools were identified. Selected examples from each appear in Table 1. Existing education and assessment modalities related to SBP include hospital-wide certification in Joint Commission on Accreditation of Healthcare Organizations (JCAHO) guidelines, Health Insurance Portability and Accountability (HIPPA) regulations, infectious control standards, safety practices, and mass casualty alerts were suggested. It was also noted that anesthesiology educators conduct focused observation daily. Existing evaluation forms need only minor

modifications to address the competency of SBP. Much overlap between the domains of professionalism, interpersonal communication and SBP was also recognized.

Discussion:

Systems-Based Practice is the sixth of the six core competencies proposed by the ACGME; it is also the one that creates the most confusion amongst educators and practitioners. Physicians may not be aware of open systems theory and that it can be readily applied to anesthesiology in the health care setting. Once understood, numerous examples of SBP in anesthesia practice can be easily identified, taught and evaluated. By acknowledging that anesthesiologists are exposed to many areas of SBP, the education and evaluation of residents in this competency becomes a task that is neither arduous nor obtrusive.

Systems theory was first proposed to describe the contradiction between the thermodynamics of living organisms and the second law of thermodynamics (3). Von Bertalanffy said, "We must conceive systems [as] elements in mutual dynamic interaction, and discover the laws that govern the pattern of [its] parts and processes." An open system imports energy from the outside in order to increase heterogeneity and order. Systems theory is often used to describe social organizations and when it is applied to healthcare facilities; anesthesiologists can be seen as one component or element continually interacting with other elements involved in the process of patient care.

Recognizing these interactions and how they support or interfere with the overall function of the facility can create learning and evaluative opportunities. The participants in the SBP work session readily identified that inefficiencies, mismatches, and gaps in system functions as areas for learning and observation. These elements, as defined by Harrison and Shirom, are the key to understanding any organization (4).

For example, a patient with pseudocholinesterase deficiency receives Succinyl Choline. This may reflect a problem with input (medical record availability, preoperative clearance procedures, or

communication) or process (syringe labeling, sign out, or knowledge deficit). Components in the system that may be affected include: OR turnover, PACU or ICU nursing assignments, respiratory therapy, surgeon interaction with patient, and the OR schedule.

Portfolio projects were chosen as one method to educate and assess SBP. The ACGME describes a portfolio as “a collection of products prepared by the resident that provides evidence of learning and achievement related to a learning plan.” (2) One example of a portfolio project was for a resident to conduct a “mini” Root Cause Analysis (RCA) as a way to identify systems problems. RCA, both departmental and individually performed, has been described as a successful learning experience, which was easily assessed (6). Other attractive portfolio projects developed by the focus group were either the observation or role-playing of other elements within the system. By rotating through other departments or completing problem-based workbook scenarios, residents can gain an appreciation of the system, its dynamics, and their effect upon it. These projects can be placed in the resident’s education portfolio. Training programs in emergency medicine (7) and psychiatry (8) have reported successful use of similar portfolio projects.

Checklists were seen as rapid and accurate evaluation tools for SBP tasks. In neurology (9) and emergency medicine (10), the use of checklists, both paper and computer based, has been found to be successful. Delineated lists of observable tasks have been observed to increase understanding and compliance.

The feedback and review portion of the focus group work session allowed brainstorming and collaborative learning. The group observed that aspects of SBP are already a part of anesthesia residency training and evaluation. Certification from hospital-wide compliance requirements and attendance sheets from interdisciplinary and quality improvement meetings can easily be used as documentation for SBP (11,12). The addition of appropriate language to existing evaluation forms, which assess pre-operative evaluation, anesthetic plans, pain team interactions, and intraoperative interactions, can help increase awareness and appreciation of SBP by residents and faculties (13). A

single tool was envisioned to assess professionalism, interpersonal and communication skills, practice-based learning and improvement as well as SBP, taking advantage of the considerable overlap between these four areas.

Several limitations of this undertaking need to be recognized. Only a fraction of anesthesiology residency programs and educators were represented during this process. The proposed techniques to educate and evaluate SBP in this paper require further discussion and exploration with those programs to address any deficiencies. Some residency programs may find the suggestions to be too broad or too specific for their purposes. Modifications and additions may be needed. Of note, the tools described in this paper have not been validated or approved by ACGME. The work accomplished by the Task Force should be seen as an initial foray into ongoing process.

Conclusion:

By gathering together anesthesiologists from different programs and locations, the Society for Education in Anesthesia was able to generate a broad consensus on how to educate and evaluate for SBP. Small group interactions amongst colleagues created an opportunity for brainstorming and collaboration resulting in new and original solutions to the challenge set before us by the ACGME. Systems-based practice, which initially seemed a daunting educational and evaluative prospect, was smoothly and creatively addressed by viewing the competency through open systems theory. This approach aided in understanding, identifying and addressing SBP in anesthesiology residency education.

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Table 1: Systems-Based Practice Spheres in Anesthesiology with Examples of Observable Tasks

Spheres	Tasks	Education	Evaluation
Pre-Operative Assessment	Data gathering Obtains Consults Educates Patient Enhances Patient Flow Communicates with Team	Charting and IT systems Best Practice for Consults Guidelines/Rules/Advocacy Efficiency vs. Care Relevance vs. Completeness	Task Checklist Delays & Cancellations 360 Survey- Pts, RNs, Surgeons Portfolio - Time flow study CSR ² of Preop Impact
Intra-Operative Management	Checks OR ¹ schedule Prepares Room Selects Meds & Supplies Anticipates Postop Care Turn Over Rooms	Scheduling Considerations Equipment Safety/Technology Costs vs. Charges vs. Value Improve & Speed Recovery Efficiency vs. Safety	Portfolio - Self RCA ³ of OR problems - PACU Problem Patient -QI ⁴ Checklist - Include SBP in existing forms
Inter-Disciplinary Pain Team	Identifies Team Members Explains Policies/Procedures Reads, Sets & Clears Pumps Orders Appropriate Meds Participates in D/C Planning	Team Members' Roles Healthcare Administration Technology Cost-Benefit Ratio 3 rd Party Payer Considerations	Task Checklist - CSR - Effective Team member Portfolio - Comparative Cost Analysis - Mock Letter to Insurer
Healthcare Facility's Providers	Observe/Role Play - OR coordinator - Circulating or ICU RN - Surgeon - Billing Specialist	Responsibilities & Interactions of - OR coordinator - Circulating or ICU RN - Surgeon - Billing Specialist	Portfolio - Report on time resident spent - Completed work book 360° Survey - Observed Providers

¹Operating room ,²Chart-stimulated review ³Root cause analysis ⁴Quality improvement

Table 2: Overall Goal of the SEA Workshop on Competency in System-Based Practice

The Goal of the Workshop is Define SBP in the context of anesthesiology residency education and to produce Evaluation Tools

Core Competencies for System-Based Practice

1. Understand interaction of anesthesia practices with the larger system
2. Demonstrate knowledge of practice and delivery systems
3. Practice cost effective care and resource allocation
4. Advocate for patients within the health care system (quality of care and improve health care)

Learning Objectives for the SEA Workshop on the ACGME competency: Systems Based Practice

By the end of this Workshop the participant will be able to:

1. Define Systems-Based Practice in the context of an Anesthesiology Residency program.
2. List the Systems-Based Practice areas that are applicable to Anesthesiology.
3. Establish Systems-Based Practice objectives to address core competency-based requirements
4. Identify various Assessment methods for the evaluation of competency in Systems-Based Practice
5. Evaluate the link between Learning Objectives and the Evaluation Tools to address Systems-Based Practice knowledge and performance
6. Diagram the pros and cons for the application of different evaluation tools in the context of systems-based practice in anesthesiology for use in a specific anesthesiology program.

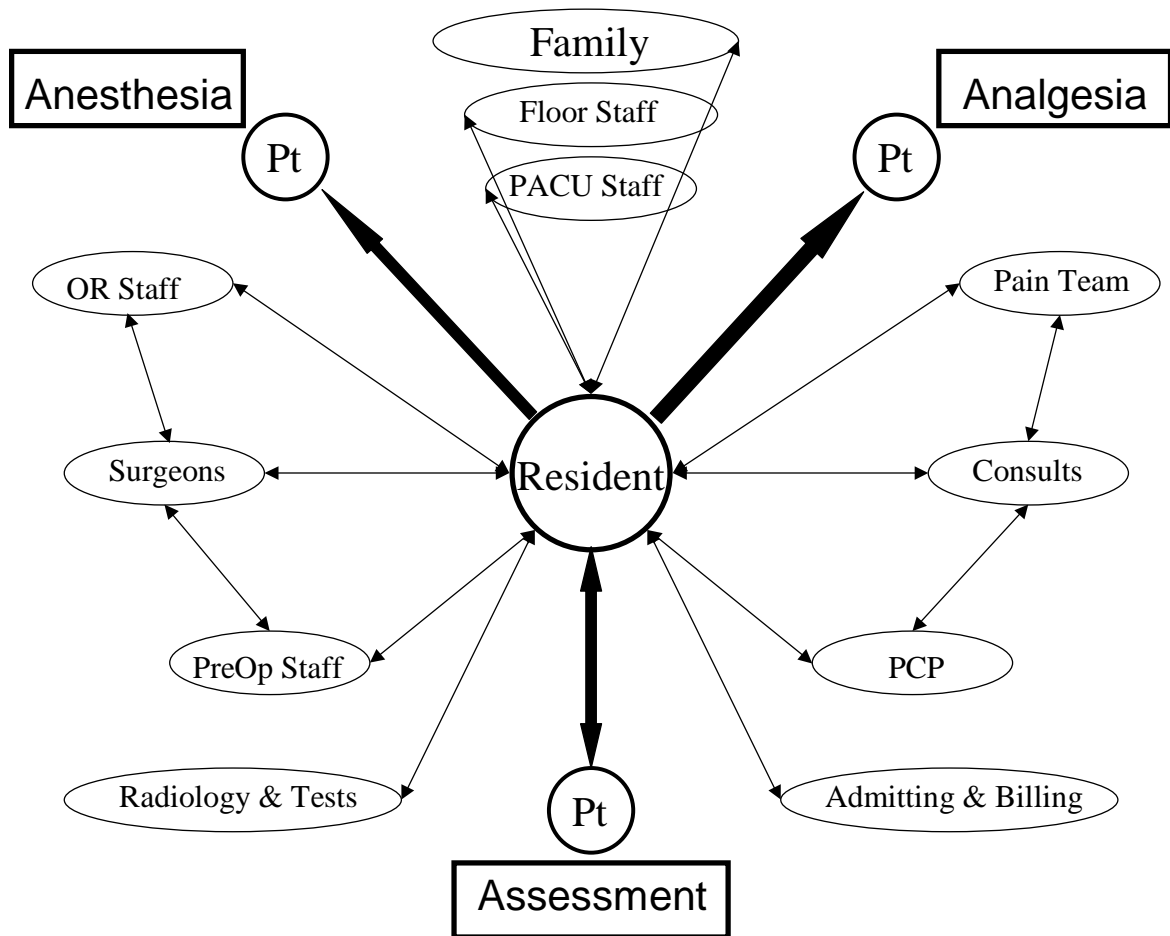


Figure 1. Diagram of Systems-Based Practice for Anesthesiology Residency Education

Ovals - System components: Elements of health care facilities encounter by anesthesiology residents

Arrows - Interactions between anesthesiology residents and elements of health care facilities

Rectangles - System processes and outputs: Goals of anesthesiology residents' interactions with elements of health care facilities