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Secondary Goals of Anesthesiology Grand Rounds

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Introduction: Anesthesiology Grand Rounds has been defined as the main instructional conference of a residency program targeting both faculty physicians/anesthesiologists and physicians in training¹. Most but not all programs evaluate this conference using assessment tools that focused on retention of information presented and/or the impact on anesthesia practice. Additional goals for this conference exist but little attention has been directed to assessing how well these goals are met. Explicit recognition of secondary goals is the first step to assuring that they do not adversely affect the primary goal of anesthesia education.

Methods: A structured telephone interview was conducted with anesthesiology residency programs listed with the Accreditation Council for Graduate Medical Education as previously described. The telephone interviews followed a structured questionnaire and lasted 10 to 30 minutes. During the interview process and related discussions, additional goals for Anesthesiology Grand Rounds became apparent.

Results: 136 Anesthesiology Training Programs were contacted. During the survey, other or, secondary goals became evident especially when discussing the organization of the conference and selection of speakers. Secondary goals identified included: establishment of departmental identity; promotion of departmental cohesion; review of morbidity and mortality data; compliance with regulatory requirements for substance abuse prevention; rehearsal of presentations for national or international meetings; establishment of local standards of care; recruitment of new faculty; entertainment; the introduction of new faculty members to the department; evaluation of faculty teaching abilities; raising awareness of important departmental and societal issues that relate to anesthesia care.

Discussion: The main purpose of Anesthesiology Grand Rounds is the teaching of anesthesia providers at all levels of training from new students and residents to experienced faculty. Secondary goals were

appropriate if they had no adverse impact on the primary goal of teaching. These secondary goals may be fulfilled without reducing and, in many cases complementing, the quality of the teaching experience. Recognition of the multiple facets of Grand Rounds is the first step in assuring the appropriateness of these secondary goals and assuring that they are properly fulfilled.

SECONDARY GOALS IDENTIFIED

1. **Establishment of departmental identity**
2. **Promotion of departmental cohesion**
3. **Review of morbidity and mortality data**
4. **Compliance with regulatory requirements for substance abuse prevention**
5. **Rehearsal of presentations for national or international meetings**
6. **Establishment of local standards of care**
7. **Recruitment of new faculty**
8. **Entertainment**
9. **The introduction of new faculty members to the department**
10. **Evaluation of faculty teaching abilities**
11. **Raising awareness of important departmental and societal issues that relate to anesthesia care**

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“For the Boards...” The Board Preparation Program in the St. Louis University Department of Anesthesiology

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Introduction Board certification in Anesthesiology has become a mark of excellence for the anesthesia practitioner in the United States. The guidelines for board certification are established by The American Board of Anesthesiology (ABA). All accredited anesthesiology training programs in the U.S. strive to exceed these requirement. In the following discussion, the educator is given a description of the structure that is utilized at St. Louis University to prepare trainees to successfully pass the board certification examination as administered by the ABA.

Methods Philosophically and pragmatically, “*For the Boards...*” begins the board preparation process from the very first day of residency and extends through the end of the third year. Key components of this program include: a comprehensive lecture series focusing on key components of the ABA content outline, seminars with attending staff, mock oral examinations, participation in a written examination process designed to highlight key topics in anesthesiology and an ongoing daily didactic program.

In the third year of training, senior residents are presented with intensive review sessions designed to

highlight key areas of anesthesia knowledge (for example, an intensive review of anesthesia for the pediatric patient). Additionally, in the third year, residents answer between 3,000 and 4,000 high quality “board type” questions designed to prepare them for the written board certification examination. In these sessions, residents focus on test taking skills as well as reviewing critical concepts in anesthesia.

Board relevant materials are presented to the residents on a daily basis. An in house publication, “*For the Boards...*” is published every 6 to 8 weeks. This publication reviews “clinical pearls” that can help the resident in daily anesthesia practice as well as providing a resource for written and oral board certification.

The most recent venture of “*For the Boards...*” is internet learning. All residents in the residency are provided with internet access to the departmental website. Key words are posted on a weekly basis. These key words are reviewed and studied by the residents. Every 6 weeks, residents take written examinations over these key words, the goal being to reinforce learning as well as acclimate the resident to the testing process. An important feature of this aspect of the program is that the residents can access the website from their own computers at home, thus being able to do “distance learning” from the comfort of their own homes.

The entire written didactic program is complemented by the operating room experience as well as intensive sessions with the human simulator.

Results “*For the Boards...*” is a relatively new program. At this time, we do not have extensive results. Residents who have participated in the program report satisfaction with their preparation for board certification. The program is respectfully presented to the S.E.A. in the spirit of stimulating dialogue.

Discussion Board preparation and certification is one of the most daunting tasks that the resident faces. Challenges that the resident faces are significant. “*For the Boards...*” provides the resident with a structure through which he or she can be successful in obtaining board certification in anesthesiology.

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A Curriculum for Teaching Medical Students Airway Skills

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Introduction Medical students are introduced to basic airway management and other medical procedures through a variety of methods. The Clinical Procedures Course, offered late in the second year, provides every student with a foundation in patient care procedures prior to entering the third year clinical rotations. Faculties who facilitate the course are primarily from the department of anesthesiology, although members of the departments of critical care medicine, emergency medicine, orthopedics, and pediatrics also participate. Residents and fellows are encouraged to participate, but the majority of instruction is by the faculty. One course session, “Hold your Breath”, focuses on respiratory evaluation and airway management skills. It includes instruction in basic respiratory assessment, respiratory therapeutic modalities, chest radiographic evaluation, and basic airway management skills to a group with little prior skill in this domain, and with only moderate patient contact.

Methods All second year medical students participate in this four-hour session. Each group of 50 students

per day are further divided into 4 groups of 12 to 13 students that rotate through one of four concurrent stations. The four stations include: 1) a problem based discussion regarding the recognition and management of a patient with respiratory distress, utilizing a videotaped scenario; 2) an airway mannequin station where the manual skills to perform airway maneuvers, mask ventilate, and intubate can be demonstrated and practiced; 3) a simulation session utilizing different scenarios to teach basic responses and respiratory therapy; and 4) an interactive facilitated discussion of abnormal chest x-rays, utilizing slide projections that builds on the students pre-study of normal chest x-rays. The facilitators utilize a checklist to record satisfactory student performance at each station. The students evaluate the “Hold Your Breath” session using a satisfaction scale checklist (A = outstanding to E = poor) at the end of the day.

Results Evaluations were obtained from 89 out of a possible 293 students during the 2001 and 2002 iterations of the course. The combined ratings by the students are in [Table 1](#). Though evaluation returns were relatively low, student satisfaction with the small group experiences is quite high (89.9%). Satisfaction with the lecture component was much lower (72.4%).

Discussion This approach to the introductory instruction of airway management appears to be a good one. Much of the afternoon utilizes participant driven small group simulated patient environments. Opportunities for the students to have “hands on” participation are generally the highest rated. The small group size is important to make the interaction personal, non-threatening, and interactive between the facilitator and the participants. An original large group introductory lecture (50 students) has been discontinued based on the difference in the ratings between the two learning environments. Future plans incorporate greater use of higher fidelity patient simulators in the course, assessment of the degree of long term retention of the airway skills acquired during this session, and improved student evaluation return rate.

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Figures and Tables

Table 1

Respiratory Assessment, Airway Management, Respiratory Therapy, and Chest X-ray Evaluation -Student Evaluations 2001/2002

Student rating	A = Outstanding	B = Good	C = Satisfactory	D = Fair	E = Poor
Lecture Rating	23/76 = 30.3 %	32/76 = 42.1 %	17/76 = 22.4 %	4/76 = 5.2 %	0/76 = 0 %
Small Group Rating	50/89 = 56.2 %	30/89 = 33.7 %	8/89 = 9.0 %	1/89 = 1.1 %	0/89 = 0 %

Standardizing Perioperative Evaluations for Multidisciplinary Resident Education through a Web Based Teaching Tool

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Introduction Preoperative evaluation education for anesthesiology residents has primarily been through clinical apprenticeship-based training. Due to increasing surgical demand, other physicians are also providing preoperative evaluation services with an extended emphasis on perioperative care. Because of multiple clinics providing evaluation services, a consistent approach to preoperative education and formal didactic teaching is lacking to date. In order to standardize core educational training needs for all perioperative physicians, members of the Department of Anesthesiology at Mayo Clinic Jacksonville underwent the task of developing a computerized, web-based tool for teaching comprehensive perioperative consultation to both anesthesiology residents and other residents who require perioperative instruction.

Methods This web based perioperative teaching tool includes written text, problem-based learning, decisional flowcharts and algorithms from the teaching viewpoint of an anesthesiologist. Therefore, content design was based on traditional preoperative anesthetic evaluation organization using organ systems as main sections with available links to other pertinent websites for further reading. Section objectives were clearly defined at the chapter beginning and Special considerations were included at the end of the material along with section-specific multiple choice testing. Our System was designed to run on common Microsoft web servers. See Screenshot of Airway Content Page ([Figure 1](#)).

Results Our design format allowed initial staff users to easily follow through a system-specific examination of a patient with commonly encountered disease processes. Initial content focused on 4 core organ systems: airway, pulmonary, cardiovascular and neurological. Multiple pretest and posttest versions were used depending on factors determined by the user's login information such as year of residency, specialty and how many times previously tested. Statistical analysis of initial logins and completed testing information was made readily available through data mining.

Discussion To date, this tool has been beta tested only on anesthesiology faculty. Preliminary feedback indicated positive attitudes toward distance learning and notations in further study as evidenced by use of optional links. Advantages stated include ease of use, wide availability of access plus location and time independence. Since our initial evaluation has shown efficacy of this program, we will implement this teaching tool into our anesthesiology curriculum starting July 1. To objectively evaluate this instructional delivery method, we will compare multidisciplinary residents' knowledge gains with pre and post testing. Blinded-data from resident testing will be evaluated after initial start up of residency programs this academic year.

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Figures and Tables

Figure 1

The screenshot shows a web browser window titled "Dept of Anesthesiology - Microsoft Internet Explorer". The address bar shows "http://localhost/". The page content includes the Mayo Clinic logo and "Anesthesiology" text. A navigation menu on the left lists various medical specialties, with "Geriatric" highlighted. The main content area features a "History of Present Illness" dropdown menu and a "Perioperative Clinic" dropdown menu. The "Objectives" section lists four points regarding airway examination knowledge and skills. The "Overview" section discusses the importance of airway management in anesthesia. The "ANATOMY REVIEW" section contains three diagrams of the airway with labels for the Uvula, Palatoglossal arch, Palatopharyngeal arch, Tonsil, Thyroid ligament, Hyoid bone, Thyroid cartilage, Cricothyroid ligament, Cricoid cartilage, and Trachea. The footer of the page reads "Dept of Anesthesiology, Mayo Clinic, Jacksonville".

Screenshot of Airway Content Page

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Assessment of ACGME Competencies: Beginning with the Resident Selection Process

Introduction The first step to achieving the ultimate goal of educating physicians competent in all aspects of specialty practice is to successfully select resident candidates who are most likely to achieve those competencies. With the large increase in number of quality applicants to anesthesiology, a selection system was needed to better assess these qualities in an objective manner. Others have described factors used in the ranking of candidates.^{1, 2} This selection system was redesigned to assess characteristics thought to be predictive of achievement of specialty-specific and ACGME general competencies in Anesthesiology.

Methods The admissions committee devised a scoring scheme that itemized and assigned values to all components of the application material and interview evaluations (Table). The system was designed to assess and identify characteristics thought to predict success as a Consultant Anesthesiologist, including qualities exemplified by the ACGME General Competencies. In addition to measures of knowledge and academic performance (traditional items for selection), the system assessed important qualities such as communication, insight, humanism, problem solving, and interest in patient-centered care and ethical dilemmas. The unblinded interview was structured to review application documents with the applicant and assess commitment to the specialty. The blinded interviewer was provided with only the personal statement and curriculum vitae. This interview focused on the applicant's interest in and ability to discuss ethical issues, conflict scenarios, and systems based patient care. Both interviewers scored the resident for communication skills and presentation. Forty percent of the final score related to demonstration of these qualities in the two interviews. After interviews were completed, scores were compiled and a match list was ordered from highest to lowest total score. The selection committee met to finalize the match list.

Results Of 499 applicants, 90 were interviewed for 14 positions. During the final list review, the committee made adjustments based on the following factors: candidates in the couples match, specific research interests / background, and affiliation with the Vanderbilt University and Meharry Schools of Medicine. Several candidates were withdrawn from the list for inadequate academic achievement or changed position on the list with input from the Chief Residents or administrators. Changes in the match list order were minimal otherwise.

Discussion We redesigned the resident selection process by establishing criteria for assessment of personal characteristics and academic achievements thought to predict success as an anesthesiology resident. The assessment process (evaluation of application materials and assessment of interviews) included evaluation of general competencies (communication / interpersonal skills, professionalism, systems-based practice, practice-based learning). The rank order list generated by this process was altered minimally prior to submission to the match service. This is the first step in a long-term project to attempt to select residents who will be better able to achieve specialty-specific as well as general ACGME competencies.

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Figures and Tables

Table 1

Applicant Assessment Scoring Scheme

Applicant Assessment Scoring Scheme:	
Academic Achievement	50
USMLE Scores	20
Merit / Honors	10
Transcript	10
Dean's Letter	10
Interview 1 (unblinded)	20
Interview 2 (blinded)	20
Research experience/interest	5
Interest in Vanderbilt program	5
Total	100

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What do They Know? Theoretical Knowledge of Practicing Anesthetists

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Introduction It is generally accepted that practicing anaesthetists require adequate knowledge of basic sciences relevant to anaesthesia, and in most countries some form of basic science knowledge assessment is carried out during the training programme. It is also assumed that once this assessment is complete such propositional knowledge is quickly lost. Little data is available on the rate and extent of this decline in knowledge. We are performing a study to evaluate this process. Preliminary data are presented.

Methods Anaesthetists attending several postgraduate educational meetings were asked to complete a short multiple choice paper containing 5 questions based on the physiology syllabus of the current UK Primary FRCA examination. They were then asked to indicate the year in which they passed the basic science component of their professional examinations. Further questions concerning their subspecialty interests, involvement in teaching and attitudes to multiple choice examinations were also completed.

Results 115 practicing anaesthetists completed the questionnaire, the majority of whom were consultants. There is indeed a decline in the mean score over time, although this is extremely slow. The overall scores are still high even 20-30 years after passing the examination!

Most anaesthetists felt that basic science knowledge was important in anaesthetic practice and that multiple choice examinations are a good way of testing it. Almost all felt they had forgotten "most of" the material they had learned for their exams. The sample was not large enough to evaluate the impact of teaching activities on the rate of decline in knowledge.

Conclusions Contrary to commonly held perceptions, much of the theoretical knowledge gained at an early stage in training appears to be retained for many years. Anaesthetists recognize the importance of basic science knowledge in their own practice. The limitations of this small study will be discussed and the Society members will be asked for their suggestions on how best to continue the project.

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Assessment of Resident & Faculty Perspectives on the General Operating Room (OR) Learning Experience

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Introduction In 2002-03, the number of months of non-subspecialty General OR (GOR) experience at the Vanderbilt University anesthesiology residency program comprised 5½-9 (median 6½), 1-4 (3), and 0-7 (2½) of the CA1, CA2, and CA3 yrs. The GOR experience typically represents a third of a resident's 3-yr training. New strict limitations on resident work hours¹ combined with fundamental change in residency accreditation philosophy and requirements (Outcomes Project; Assessment of 6 Core Competencies)¹ prompted us to scrutinize the value and quality of the GOR learning experience with the aim to design improvement. The 1st step in this process was a survey of resident and faculty perspectives.

Methods A survey was designed for faculty and residents containing 31 analogous, matched questions, addressing six constructs relative to the GOR experience – *Communication, Resident Autonomy/Initiative in Patient Care Decisions, Practice-Based Learning/Improvement (PBLI), Feedback, and Quality of Mentored Learning*. Each of 29 statements required numerical answers (1 strongly disagree, 2 somewhat disagree, 3 neutral, 4 somewhat agree, 5 strongly agree); the remaining 2 required % estimates. Surveys were distributed in Dec 2002 and were returned by 40 of 40 residents (14 CA1, 13 CA2, 13 CA3) and 23 of 30 faculty with primary GOR teaching responsibilities. Answers were entered anonymously into a database for analysis.

Results Areas of agreement between residents and faculty included:

- Preoperative preparation, including faculty-resident discussion of the next day's cases, is routine and is considered a valuable learning experience.
- Residents routinely take initiative in performing procedures and making training-level appropriate **patient care** decisions in the OR, permitting a considerable level of autonomy under faculty supervision.
- **Problem-based learning and improvement** through examination, reflection, and discussion of outcomes is not routinely practiced, and should be improved.
- Written **feedback** from the faculty is not routinely submitted, and should be improved.
- Residents receive inadequate evaluation and feedback from faculty on their **communication and interpersonal skills** in the OR.
- **Quality of mentored learning** is good, but not optimal, and would be improved through increased faculty feedback on resident performance.
- Lack of continuity in attending-resident assignment hinders learning and teaching.

Differences in perceptions between the groups included:

- Residents think the pre-op discussion is frequently too superficial.
- Residents' estimate of amount of articles/teaching material provided by faculty is less than faculty's.
- Residents perceive less amount & quality of teaching/learning in the OR than faculty.
- Residents feel they receive (and seek) little verbal daily feedback, while faculty think that they do provide some feedback, though the residents rarely seek it.

Discussion While areas of strength were identified, resident and faculty perceptions suggest that improvement is needed in teaching / assessing Communication & Interpersonal Skills, and PBLI. Timely verbal feedback and examination/discussion of outcomes, vital to PBLI, are insufficient in quantity and quality. These survey results will guide fundamental restructuring of the GOR learning experience to improve teaching and assessment of these important competencies.

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Controlling Cost of Teaching in a Simulation Laboratory by Expanding the Operator Role

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Small group learning sessions using simulation have been well received. However, a major drawback is the considerable faculty time commitment. This expense can be contained by utilizing simulation operators to manage appropriate sessions. Simulation operators have a unique opportunity to learn due to their regular presence during educational sessions.

Examples When a physician is present during a self-directed, diagnostic practice session, the students are very likely to turn to the instructor for answers and help. When the instructor is an operator, however, the students tend to first attempt to work out the problem for themselves. (Henry 2001)

Public Relations is an area in which an operator is especially well-adapted to perform: an operator, exposed to curricula from multiple departments, can discuss many topics. Operators are also able to answer more detailed questions than most faculty regarding the simulation equipment in the lab.

Operators can help with curriculum development, being able to discuss what other groups have found to be successful or problematic.

Seeing what a specialty does and how it is done enables the operator to play the part as an actor of a doctor from that specialty during other sessions.

A large percent of scenario development and patient design on manikin-based simulators can be done by an operator. (Genevivia 2001) This decreases the hesitancy of new faculty to use the simulator.

Conclusion As the operator gains familiarity with teaching sessions, an increasing number and variety of

sessions can be managed very efficiently by the operator, thereby minimizing expensive faculty involvement.

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Development and Validation of the Anaesthetic Trainee Theatre Educational Environment Measure (ATEEM)

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Introduction Genn¹ has clearly established the importance of educational climate. To measure the educational environment for trainee anaesthetists in the theatre setting a sensitive and robust diagnostic tool has been developed and validated.

Methods 156 items for inclusion in the Anaesthetic Trainee Theatre Educational Environment Measure (ATEEM) were obtained from a literature search and focus groups of 14 anaesthetic trainees, 32 educational supervisors and 3 regional programme directors. Further refinement and validation was done by ratings from trainee anaesthetists using a Likert-type scale of 0 - 4 according to how important they felt each item was in creating a good learning environment for “ In Theatre Anaesthetic Teaching”. Items that averaged 3.5 or more were subjected to qualitative analysis for removal of those that were repetitious or poorly worded. The final 40 items were randomized to form the ATEEM which was then administered to 271 anaesthetic trainees within the West Midlands.

Results. 218 questionnaires were returned. Problems were identified at various levels. Individuals who were having problems were highlighted and located with anonymity. Areas were highlighted that could be improved by intervention at individual hospitals for specific items and subscales. The ATEEM successfully distinguished statistically significant differences in mean scores between the years of training at regional, school and individual hospital levels using the t test ($p < 0.05$). The ATEEM demonstrated the capacity to distinguish differences between schools and individual hospitals for both different grades and gender. The ATEEM enabled comparisons between schools of anaesthesia and individual hospitals.

Discussion The ATEEM identifies and compare the theatre educational environment for anaesthetic trainees. It has shown that the environments do vary and will enable trainers to identify problem areas and put into place measures to remedy them. The information provided by the ATEEM will be of high value in educational planning especially in view of the results obtained and should be an integral part of validating the educational environment.

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96% COMPLIANCE RE ACGME CORE COMPETENCIES

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Introduction Over the past 20 years, anesthesia residents have been evaluated at Drew University. During this period, the evaluation criteria have demonstrated a good correlation between intermural and extramural performance.

Methods We overlaid our methods of evaluation onto the ACGME Suggested Best Methods for Evaluation to determine our level of compliance.

Results Having re-categorized the current Drew University anesthesia residents' evaluation skills as they pertain to the 13 suggested 'Best Methods for Evaluation' which range from 3 to 8 suggested per required skill, our results show 96% (24 of 25) compliance.

Discussion It should be noted that the "ACGME Competencies Suggested Best Methods for Evaluation" does not provide for personal direct multiple live observations by the teaching faculty on a daily basis (Checklist Evaluation of Live or Recorded Performance) as an acceptable evaluation method in 8 of the required skills. It should be stressed that our findings demonstrate that we are currently utilizing 2 or more of the ACGME Best Methods for Evaluation for 24 of the 25 skills.

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Design of a Patient Safety Curriculum for Graduate Medical Education in Anesthesiology

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Introduction Improvement of patient safety has become a national mandate and an integral part of medical care¹. To meet this mandate, numerous patient safety experts have suggested that training in this area should be required during medical school and residency². We therefore have designed, and are currently implementing, a patient safety curriculum for graduate medical education in anesthesiology. The overall goal of the curriculum is for anesthesiology residents to learn how to study, monitor and improve

patient safety. Specifically, the curriculum has been designed so that competence in four improvement methods (structured peer review, quality management, practice parameters and risk management) is acquired progressively over the three year training period. The curriculum consists of knowledge goals, competency goals, instructional methods and assessment of educational outcomes. Specific aspects of the curriculum are described below.

Structured Peer Review Structured peer review (SPR) is a process used to monitor and analyze adverse perioperative outcomes³. Knowledge goals for first year residents consist of understanding the elements of SPR while second and third year residents are expected to understand the difference between a system and human error. For all three residency years, the SPR competency goal is to recognize that a perioperative adverse outcome has occurred, collect all relevant information and properly document this information under the direct (first year residents) or indirect (second and third year residents) supervision of an attending anesthesiologist. Instructional formats will include interactive lectures, mock peer review sessions and participation in a monthly quality management meeting. For all three residency years, assessment of educational outcomes will entail calculation of the number of self-reported adverse outcomes and an assessment of the quality of the associated documentation. In addition, interrater agreement will be calculated for mock (first year residents) and actual (second and third year residents) peer review analyses⁴.

Quality Management/Practice Parameters Knowledge goals cover the elements of quality management and practice parameters. Competency goals are performance of a quality management analysis or development of a practice parameter. Instructional formats will include interactive lectures and workshops on quality management concepts. Assessment of educational outcomes will be performed with a written examination and a performance improvement, outcomes assessment or practice parameter project.

Risk Management Knowledge goals cover the elements of risk management, malpractice litigation and malpractice insurance coverage based on various medical economic principles. Competency goals are selection of malpractice insurance coverage options and calculation of the economic cost of an adverse perioperative outcome. Instructional formats will include interactive lectures, presentations and workshops. Assessment of educational outcomes will be performed using oral presentations.

Conclusion We have described a three year patient safety curriculum for graduate medical education in anesthesiology. The curriculum will allow residents to acquire a clear and concise means of understanding the most important aspects of four patient safety improvement methods and the competence needed to improve patient care.

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Model for a Resident Competency-based Education and Evaluation

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Introduction This abstract describes a framework for evaluation and curriculum improvement built on an electronic performance database. Current approaches to the ACGME competencies involve rebuilding or reverse engineering curriculum and evaluation tools. With only general guidance from the ACGME, each department must determine the scope of each of the competencies. Task evaluation tools, often performance checklists used to evaluate discrete tasks, require a large number of checklists for comprehensive evaluation, creating a huge workload for faculty. Tools of broader scope, while much less time-consuming and more global, leave interpretation of the minimum standard to each faculty evaluator, allowing for significant inter-rater variability. We propose a system of standard evaluation that builds each competency summary from formative task observation data.

Methodology Our system creates a comprehensive picture of resident competence from faculty ratings of key indicators, in a way that takes no more time than current modes of evaluation, is task specific in each instance, and combines instances into a broad statement of general competence in each of the six ACGME areas. Based on literature review and faculty expertise, expectations for performance are listed. Each task item must be written as a monolithic statement of knowledge, skill, or judgment which is then cataloged on the dimensions of 1. phase of anesthetic, 2. core competency, 3. educational domain, 4. subspecialty, and 5. PGY level. The process of cataloging establishes a standard vocabulary for evaluation and discussion of resident performance. The catalogued items, create a database with rubrics that, when summed over time, describe the resident's evolution across all six competencies. Using this database, evaluation outcomes arise from ratings of each item in each time-specific faculty evaluation. When a resident is rated appropriate for PGY level, the evaluator can simply move on to the next question. When a rating below PGY level is given, an expanded list of specific items requiring rating will pop-up allowing further definition. This step provides the specificity of checklist oriented tools and a mechanism for identifying a resident's deficiency in terms of educational taxonomy. Defining performance in these terms allows for analysis of deficiencies of knowledge, skill, or judgment that typically go unrecognized in current evaluation modes. Finally, a focused remediation plan based on empirical evidence is created, increasing the resident's chances to improve and progress.

Summary This approach generates a broad assessment of competence from samplings of task specific ratings over time. The computer-based system of database population and analysis occurs automatically; generating both catalogued item specific and general competency reports. Reports can be generated for individuals or groups of residents or faculty for meta-analysis, leading to improved resident experience and competence, GME curriculum improvement, and faculty development. The simplicity of a broad scoped interface coupled with the detail needed to define the standard provides higher inter-rater reliability. The effort taken to create the key indicator and catalogued items results in greater power to assess resident and faculty processes, improve education, and ensure competency outcomes of GME.

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Career Goals on the Personal Statement: Fact or Fantasy?

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Introduction The personal statement has long been a component of the residency application and selection process. While the structure and content of these statements vary widely, many students conclude their statement with a reference to their plans for additional training or a specific type of practice following residency. This inclusion is not without basis, as the American Medical Association web site specifically advises students to indicate “your expected goals in the field you have chosen” as a component of the personal statement.¹ It is unclear, however, whether these expressed intentions bear any relationship to eventual career choices.

Methods Application personal statements were reviewed for all residents that graduated from the University of Wisconsin anesthesiology residency between 1993 and 2002. If an eventual career goal was expressed on the statement comparison was made to the individual’s actual postgraduate course.

Results 48 (61%) of the residents indicated an eventual career goal. Of those with a stated goal, 25 (52%) planned on a career in academics/teaching, 14 (29%) private practice, and 20 (42%) planned on pursuing

fellowship training. Only 20% of those expressing a future interest in academic practice ended up in such a setting, as opposed to 78% with an interest in private practice and 65% interested in fellowship training. 14 of the 20 residents expressing an interest in a fellowship indicated critical care as a primary choice, with the remainder divided between pain, cardiac, and pediatric anesthesia. Of those indicating an interest in critical care, only 3 (21%) actually completed critical care fellowships. Interestingly, all three individuals had previous experience in the critical care setting as physicians or nurses.

Discussion Our retrospective review showed a high correlation between residents indicating an interest in private practice and ultimately working in that setting. That is not unexpected, however, given that nearly 80% of the residents finishing the program work in private practice settings. More interesting is the low correlation between an interest in academics and eventual academic practice and the similarly low correlation between a stated interest in critical care and ultimate training in that area. It is impossible to determine at this point whether students cite an interest in these areas in an attempt merely to “impress” the Selection Committee and increase their chances of acceptance into their chosen program, or whether interest in these areas somehow wanes as a result of experiences during residency.

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A Year-Round Level-Specific Anesthesiology Didactic Curriculum

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Didactic teaching has long served as a key supplement to clinical experience in the education of anesthesiology residents. Many programs have traditionally presented topics in a rotating manner, with all residents attending the same lecture and the gamut of general and subspecialty lectures covered over an eighteen or twenty-four month period. In this system, residents receive didactic instruction in areas determined not by their level of training and experience but by the current point in the overall rotation of topics. Similarly, faculty must develop presentations for residents with a broad range of experience and are often forced to compromise and present material that may be too advanced for CA1 residents while being too basic or repetitious for a resident at the CA3 level.

We began to address this issue several years ago with the development of a three-part “Core” lecture series, providing residents with level-appropriate subject matter during the first several months of the academic year 1. We have now extended the concept year-round. In this system, each resident passes through a three-year curriculum of didactic presentations designed to present subjects in a logical sequence and increasingly complex manner.

This approach has been well received by the residents and has garnered substantial faculty support despite the number of new lectures that the transition has added. Senior resident participation has increased, presumably owing to the introduction of more level-appropriate material. The change has increased the amount of material that can be presented to each resident by eliminating the overlap and repetition inherent to conventional rotating cycles. The major challenge has been purely logistical, requiring an excellent

coordinator to ensure that the rooms and computer projection equipment are available to run three simultaneous lectures throughout the year.

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Figures and Tables

	July	August	September	October	November	December	January	February	March	April	May	June
CA1	CORE			General			Cardiac		Neuro		OB	
CA2	Physiology	Anes Machine	Research	Advanced Airway	Amb	Regional	Pain		Peds		Closed Claims	
CA3	Practice Management		Physics	TEE	Neonatal	Critical Care		Advanced Neuro	Advanced Cardiac	Government Issues	Board Review	

2002-2003 Didactic Program

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Developing Consensus for ACGME Assessment: A proposed Method Using Airway Documentation

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Introduction The ACGME expects faculty to assess resident competencies. This requires faculty to agree upon a uniform assessment protocol for each knowledge element to be assessed, often a difficult process. In this project, we created a uniform protocol based on the patient care information to be entered in the anesthesiology operating room record.

Methods A two-part survey modifying the standard expert criterion (Delphi) protocol was sent to all anesthesiology faculty, residents, and CRNAs at one major academic medical center. The first part asked open-ended questions aimed at defining what is important to write for routine and difficult airway management. The second part asked respondents to rank importance (0 (not) to 10 (very)) of each of the most identified items in part 1.

Results The analysis of responses from 39 completed part 1 surveys resulted in identification of 5 key elements for the routine record: laryngoscope blade/size (35), bilateral breath sounds (31), end-tidal CO₂ (31), endotracheal tube size (30), and grade view of the vocal cords (29). In a patient with a reported difficult airway, the identified items were: blade/equipment used (28), ability to mask ventilate (17), best view (16), and why was it difficult (12).

Survey Part 2 (sample size 30) ranking results for a routine airway showed relatively equal importance for each of the 5 indicators: EtCO₂ (9.73), type/size of blade (9.53), easy/difficult mask (9.4), number of attempts (9.37), and bilateral breath sounds (9.2). The range of variance was similar for a difficult airway,

and rankings were: special equipment used (9.93), easy/difficult mask (9.9), size/type of blades used (9.83), what was successful? (9.53), anatomic abnormalities (9.43), and number of attempts (9.37).

Discussion We developed both a method for determining expert consensus among anesthesiology providers for recording important clinical procedures as well as a set of criteria for the recording of airway experience in the operating room record. We propose further development of the two-part modified Delphi study model to determine items are greatest importance across all ACGME Competency areas. The use of this model appreciates the importance of local determination of clinical criteria based on institutional context of clinical practice. Using this model facilitates faculty participation and buy-in to departmental and institutional evaluation protocols. Our future research will include both development of protocols for additional procedures and faculty acceptance and use of developed evaluation tools.

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Achieving Competency-based Education and Evaluation in Anesthesiology: An Integrated Systems Model

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Introduction The Accreditation Council for Graduate Medical Education (ACGME) has changed its criteria.¹ This abstract presents a tangible model, developed in the Anesthesiology Department of the Penn State University College of Medicine for meeting ACGME required program evidence of resident competence. Starting in 2006, Graduate medical education programs in anesthesiology and all disciplines will be accredited based on ability to provide evidence that residents demonstrate competence in each of “six general competencies.”² Recognizing the lack of exiting evaluation approaches to provide the required evidence, the second of three prominent goals for the Council is “2. Use increasingly more dependable ...methods of assessing residents’ attainment of these competency-based objectives.”³ Theories of education evaluation, such as program evaluation⁴ or outcomes evaluation,⁵ can offer discrete answers to some of the questions, but do not provide a complete, integrated picture of either a resident’s competence at any point during the GME process or the program, taken as a whole. Our approach provides systematic data collection about critical determinants of competence for residents and program.

Methodology The development of Integrated Systems Theory of Evaluation⁶ (ISTE) provides both the framework and the contextually specific tools to build a model for ACGME Competency evaluation. This provides an approach and methods for identifying specific key indicators for each of the six competencies and a step-wise integrated system of evaluation. Using the ISTE and a defined Team process, faculty and residents formed six teams; one for each competency. Their work began with defining 3 “most important or most fundamental,” clear and concise goals of competency in each of the six areas and 2-3 educational objectives under each goal. Next, each team defined the precise elements of education (type and place(s) in the curriculum) required for learning the necessary knowledge required to meet each objective. We used the cognitive taxonomy of educational objectives⁷ to identify the domains of knowledge essential to each element. The location in the program of education for each element was identified. If education specific to any element did not exist in the curriculum, appropriate ways and specific methods and content were

developed. Finally, in this phase, evaluation methods to measure effectiveness of both learning and teaching of each element were proposed. The next phase required constructing a “first six months” time line for the development and implementation of, first, each individual objective and its evaluation, and, second, all objectives of all 6 competencies, taken together. This provides the “Big Picture” of comprehensive education and evaluation. Only by appreciating this perspective can the common ground or overlaps among the elements of education and methods of evaluation be identified and effectively integrated to produce a functional and achievable implementation of competency-based education and evaluation. For example, teams for Professionalism, Patient Care, and Interpersonal Communication Skills independently identified education and evaluation components requiring patient interview in both simulation and clinical observations. Protocols for both education and evaluation could be designed, developed and implemented to include specific content or items addressing each competency. Four months into the project, we are actively producing these tools.

Summary ACGME’s radical shift in assessment from potential for learning to program evidence of resident competence requires equally radical changes in faculty education and evaluation of resident competency. The Integrated Systems Model provides a tangible means of providing both competency-based education and evaluation of both resident competence and program effectiveness in delivering the outcomes. Analysis of the combination of resident and program data will provide specific data for improvement of education and evaluation in graduate anesthesiology education.

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Figures and Tables

Figure 1

**Action Item
First Three Steps
Schedule For Implementation
Evaluation of Effectiveness**

1. Protect patient confidentiality during patient interview

1. Lecture on HIPAA standards - J. Carroll
2. Incorporate Confidentiality principles into clinic intro lectures - D Martin

1. June, 2003 - incorporate into professionalism block in next 3 year cycle
2. Monthly, beginning March, 2003

1. Multiple choice exam - supplemental to June Block exam - Dr. Walker?
2. random patient surveys

2. Informed Consent for Anesthesia Procedures

1. Lecture on Informed Consent - statutory and ASA standards - J. Carroll
 2. Faculty model informed consent, then observe resident getting informed consent in clinic - D. Martin
 3. Coordinate with Communication Team - Drs Martin/Long
 4. Resident visit selected patients postoperatively and determine similarity between what they expected and what occurred - Dr. Cronin
1. September, 2003 - Tuesday afternoon resident lecture - incorporate into professionalism block in next 3 year cycle
 2. Monthly beginning April, 2003
 3. March, 2003

1. multiple choice exam - supplemental to fall block exam
2. Patient exit surveys, faculty critiques in preop clinic

3. Conduct of Preoperative Visit (SDU)

(Establish personal rapport with patient by demonstrating knowledge of Patient's medical context)

1. Develop Patient Assessment questionnaire - Drs High and Marine
 2. Patient follow-up assessments on randomly selected patients for each resident
1. April 1, 2003, to Education Committee by May 1, 2003
 2. Ongoing, beginning in June, 2003
1. patient survey data to be included in resident portfolios and aggregate data used to evaluate the effectiveness of the program

ACGME Competency Goals, outcomes, Education, Evaluation, and Action Plan A Model for Anesthesiology Education.

Figure 2

ACGME COMPETENCY	GOALS	OUTCOMES	EDUCATION	EVALUATION	ACTIONS
Patient Care					
Practice-based Improvement					
Communication and Interpersonal Skills					
Professionalism					

Professionalism Team Action Plan

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Making a Difference: Examining the importance of the 4yr Anesthesiology Residency

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Introduction This study explores the hypothesis that participation in a 4-year anesthesiology residency makes a positive difference in anesthesiology cognitive knowledge. This is the preliminary phase of a larger research exploring the extent to which immediate enrollment in Anesthesiology out of medical school results in greater cognitive knowledge, higher skill level, and ability to make critical decisions than transitioning through a traditional internship year. The 4-year program in the current study uses a “clinical base” (CB) approach, interspersing off-anesthesiology service rotations (i.e., surgery, pediatrics, etc) with anesthesiology rotations over an 18 month period. During all of this time, CB residents (PGY1 and 2) are released from off-service clinical duties to participate in the anesthesiology resident didactic and experiential learning elements of the curriculum.

Methodology This single-institution study uses both quantitative and qualitative methods to collect data about the performance of residents in both 3-year and 4-year programs, which are concurrent in the GME program. The Integrated Systems Theory of Evaluation¹ (ISTE) provided the basis for an education-integrated study framework with critical process determinants. The approach also defines what data to

collect at those points and what methods best capture meaningful data for an accurate picture of the program. This presentation reports the analysis of preliminary data from results of test data taken from didactic block exams across all years and interviews of both faculty and residents. After IRB protocol review and approval, structured question, non-scheduled (arranged appointment time) interviews (av. 43 minutes) of all CA3 (PGY4) year.^{2 3} The didactic curriculum includes two one-hour lectures, three one-half hour presentations, and focused case-review with faculty each week. In addition, monthly 3 hour journal club is linked directly to the block content under study. Clinical rotations for 4-year residents spread the CA1 experience over PGY1 and 2. 3-year program residents have no (or perhaps one elective rotation) in anesthesiology in PGY1.

Summary Taken together for analysis,⁴ we found that residents in each program recognize a difference in engagement with anesthesiology thinking during the PGY1 year. Both residents and faculty report that 4-year program residents are able to learn key physiology, disease process, treatment process, and interdisciplinary health care process knowledge in off-service rotations as meaningful to their anesthesiology practice. Further, their engagement with the anesthesiology program seems to be related to an immediate large positive difference from 3-year program residents in scores on block exams (see [Fig. 1](#)). Clinical faculty consistently report that 4-year residents' psychomotor skills are superior to those of 3-year residents until roughly the 9th month of PGY2 (CA1). Five of the six faculty interviewed thus far also report that they are not, on a daily basis, cognizant of which residents are in which program. Throughout the residency, the early adoption of an anesthesiology perspective by 4-year program residents results in deeper understanding of the systems of health care as related to the anesthesiologist's role. When providing specific examples of advanced decision-making and systems-based practice, 4-year residents, in PGY2, 3 and 4, are cited in nearly all cases (80%).⁵ Our analysis of year-group exam scores showed similar positive differences in all but the CA3 (PGY4) year. However, the current PGY4 group is not representative of both programs: only 2 individuals are enrolled in the 4-year program. All other years have nearly equal numbers of residents in each program. The ongoing study will include analysis of longitudinal data.

The study is limited by the relatively recent institution of the 4-year curriculum and the small number of 3 year residents in the current PGY4 cohort. We plan to expand the study to other institutions within the United States to study the nature and extent of effect of specific curriculum design on the outcomes for resident competencies across knowledge domains (cognitive, psychomotor, and affective).⁶

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Figures and Tables

Figure 1

	3-year Program		4-year Program	
PGY0 (post-medical school)	Mean	13	Mean	15.5
	n	06	n	27
	range	10 - 16	range	05 - 30
Clinical Base (CB/PGY1)	Mean	15.9	Mean	22.5
	n	18	n	22
	range	12 - 28	range	15 - 42
Clinical Anesthesiology 1 (CA1/PGY2)	Mean	22.9	Mean	28.6
	n	28.1	n	16
	range	16 - 29	range	19 - 43
Clinical Anesthesiology 2 (CA2/PGY3)	Mean	28.1	Mean	31.4
	n	17	n	11
	range	22 - 37	range	21 - 52
Clinical Anesthesiology 3 (CA3/PGY4)	Mean	34.2	Mean	31.5
	n	13	n	02
	range	20 - 43	range	24 - 39

Block Exam Results: Program by PG Year (summative 1998 – 2002).

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A Resident Survey For PACU Education and Evaluation

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Introduction The purpose of this study was to assess the feedback from the residents (CA1-CA3) regarding to their learning experience from PACU rotation in order to identify and prioritize the competencies that should be learned during the rotation. We also determine whether using and developing new tools such as the 360-degree evaluation instrument would more appropriately evaluate the general competencies.

Methods We developed a questionnaire that focused on general competencies and included 13 areas. We used the Accreditation Council for Graduate Medical Education (ACGM) guideline in six general competency areas and had the respondents who are CA1 to CA3 levels. A 5-point ordinal scale (1=poor, 5=excellent) was chosen for the scores. The PACU rotation of the residency program is 2 weeks and on one adult hospital base.

Results A total of 39 residents responded to the survey. 13 have not completed the PACU rotation and were excluded from this survey. The mean scores and degree of agreement with the statements were based on 26 respondents and shown in the Table. In general there was a good overall agreement. Only 27%

respondents heard about the 360-Degree Evaluations.

Discussion There was good agreement with regard to the most of the clinical scenarios. The three patient care and communication competencies were assigned importance scores greater than 4. This suggests these competencies are considered essential and should be highlighted as educational priorities for the PACU rotation. The 360-Degree Evaluation remains significant controversy.

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Figures and Tables

SURVEY QUESTIONS	Total Percent of Good Agreement/Mean Scores
Were the objectives as stated in the resident manual met?	96%
Was there a mix of common and uncommon cases in the PACU?	92%
Were you able to participate in scheduled educational activities of the residency program?	96%
Do you feel as if you are a part of the patient care team?	85%
Were you able to receive assistance from faculty in the PACU when needed?	96%
Are you able to exercise patient responsibility commensurate with your experience in PACU?	88%
Did you have an adequate number of patients in the PACU?	85%
Do you think the feedback you received addressed the 6 competencies: Patient Care; Medical knowledge; Practice-based learning and improvement; Interpersonal and communication skills; Professionalism?	88%
Have you heard about 360-Degree Evaluations which consist of measurement tools completed by multiple people in a person’s sphere of influence such as superiors, peers, subordinates, and patients and families?	27%
Did the PACU resident manual meet your rotation requirement?	88%
Rate the quality of your patient care experience in the PACU 1 = Poor 5= Excellent	4.12
Rate the PACU commitment to patient safety: 1 = Poor 5= Excellent	4.27
Rate the working relationship between residents and PACU nurses: 1 = Poor 5= Excellent	4.08

The Epidural Needle Deviates More in “Tougher” Simulated Tissues When Higher Insertion Forces are Required

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Background The tip of a Tuohy epidural needle is asymmetrical (Beveled). The forces applied to the needle tip during advancement of the needle cause the needle path to veer off (deviate from) a straight line (Kopacz 1995.) We were interested to study to what extent the consistency (resistance) of the “simulated tissue” would influence the degree of deviation and whether teaching techniques need to be adjusted.

Method We prepared gelatin concentrations (15%, 20%, 26%, 34%, and 41%). We measured the force required to penetrate each gelatin mix (Minarcik 2002.) We measured (average of 10) the deflection of the tip of the needle in each concentration (rise/run – see [Fig 1.](#))

Results The force required to insert the epidural needles varied from 2 to 20 Newtons with higher concentrations of gelatin requiring greater forces.

The deviation varied from 1 mm deviation per 10 mm traveled in the soft (15%) gelatin to 3 mm per 10 mm in the tougher (41%) gelatin.

Discussion The forces required to penetrate the gelatin mixes covered the range of forces encountered clinically (Minarcik 2002.) The force required to penetrate the gelatin mixes increased with the concentration of the gelatin. The deflection of the needle also increased as the concentration of the gelatin increased. The implications are that the deeper and tougher the tissues and ligamentum flavum, the more deflection will occur. Faculty teaching epidural insertion techniques may wish to take this deviation into consideration during instruction of residents. For instance, the starting angle of insertion may have to be adjusted (less cranial angling) under circumstances of deeper and tougher tissues.

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Figures and Tables

Figure 1



The epidural needle was inserted at right angles into the core of the gelatin tube and advanced until the needle tip was seen exiting from the side of the tube. The deviation was calculated as rise/run (mm deviation / mm traveled.)

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Applying Theory to Practice Using High-Fidelity Patient Simulation

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Introduction Knowledge of the pharmacology of emergency cardiac drugs is a necessary educational objective in the undergraduate medical curriculum. High-fidelity patient simulation allows students to experience pharmacology and physiology in action. The purpose of this study was to determine if experiential education improves performance scores on a simulation-based and written examination.

Methods After research ethics board approval, final year medical students attending an educational session in the simulation centre were enrolled in the study after informed consent was obtained. On arrival to the simulation centre, students completed a 10 question multiple-choice quiz to identify their knowledge regarding the management of cardiac arrhythmias. Four simulation scenarios involving cardiac arrhythmias were presented during the morning session. Students worked through the scenario using the high-fidelity patient mannequin, with 1 student as team leader and 2 others role playing a nurse and respiratory therapist. A faculty member facilitated the sessions which were video-taped. After each scenario, feedback was given by the attending faculty and included an educational session using the students' performances as a template for discussion. Performance evaluation scores were determined using predetermined checklist protocols. Students then reviewed the American Heart Association current guidelines for the management of unstable cardiac arrhythmias. The afternoon session involved repetition of the 4 case scenarios with the same teams involved but different team leaders. Following replay of the scenarios, students repeated the quiz they received in the morning. Descriptive statistics and repeated measures analysis of variance (ANOVA) were used to analyze the results.

	Defin No	No		Yes	Defin Yes
Were the scenarios realistic?	0	0	0	7	5
Were the students motivated to learn?	0	0	0	7	5
Were you comfortable facilitating the group?	0	0	2	5	5
Did you enjoy educating undergraduate students?	0	0	1	4	7
Do you plan to continue in an academic centre when your residency is complete?	0	0	3	3	3

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Assertiveness Training During a Crisis Resource Management (CRM) Session Using a Full Human Simulator in a Realistic Simulated Environment

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Background Residents and medical practitioners with excellent clinical knowledge and skills may not have had the opportunity to fully develop their communication skills. For instance, they may be non-assertive: unwilling to initiate tasks, speak softly, not follow through on a task they know should be done, etc. It is very difficult for residents to change such non-assertive behaviors until they “see” themselves in a different light, e.g. on a videotape recording. They also need a venue (opportunity) to repeatedly practice the positive behaviors. It is not feasible to perform such videotaping in the clinical arena. Furthermore, it is also not possible to debrief in a busy clinical environment. We developed two pathways to provide opportunities for assertiveness training.

Method The Simulation development and Cognitive Science Lab at Pennsylvania State University offers weekly Crisis Resource Management (CRM) sessions (Gaba 1988) during which principles of leadership, communication, calling for help, using resources, avoiding fixations, etc. are taught in a realistic simulated environment using a full human simulator (M.E.T.I., Sarasota, FL.)

- A. During the first (“null”) scenario, the participants are introduced to the environment and the simulator. As part of the demonstration, the “patient” requires intubation. This affords the opportunity for the non-assertive resident to take control of the other participants and direct them to perform specific tasks.
- B. Our CRM sessions typically require sequential entry of trainees (Murray 1999): Firstly, the nurses “discover” the problem, then they call the primary care physician (residents from surgery, cardiology, internal medicine, pediatrics, etc.) who have to take over the leadership. Lastly, an anesthesia resident is called to assist with the intubation. Inserting a non-assertive trainee at any of these points affords the opportunity to practice the required assertive behaviors.

Discussion:

- A. Debriefing of the “null” scenario can occur in a private, one-on-one session. This is useful for the

first few practice sessions. Residents can compare their progress and improvement using the videotaped sessions.

- B. Once the non-assertive resident has progressed (built up self confidence) to function in the second (“real”) crisis scenario, the behavior can be debriefed in a group setting. The peer evaluation and acceptance of their leadership role encourages further assertive behavior in this supportive, non-threatening environment.

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Evaluation of the Perceived Value of a Supra-glottic Airway Management Course for Non-anesthesia Military Health Care Providers

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Introduction Airway management skills are important for all health care providers, especially in a military conflict arena (far-forward-front) where multiple casualties may occur. This investigation performed a prospective survey to evaluate the perceived value of a basic airway management course designed to teach primary supra-glottic airway management skills (in contrast to intubation skills) to military non-anesthesia health care providers.

Methods The US Army Reserve Training Site Medical at Fort Gordon, Georgia offered a 4 hour basic airway management course to military reserve health care providers (non-physicians) who were being deployed to Afghanistan or conducting unit training. Following Institutional approval, the trainees received didactic and simulation laboratory based instruction including hands-on practice using an airway training mannequin with supraglottic airway devices (bag-mask ventilation, laryngeal mask airway, CombiTube, etc.). At the conclusion of the course they completed a survey designed to evaluate their perceptions of the utility of the training.

Results 96% of participants (n = 25) were *completely satisfied* with their experience in the airway management laboratory and 4% were *mostly satisfied*. None were *neutral* or *dissatisfied*. 96% enjoyed the airway training workshop. 86% would be interested in attending an advanced airway workshop and the 3% who were not interested in attending an advanced workshop felt the airway training was outside the scope of their specific practice. 80% felt this training would enhance their ability to treat patients. 100% would recommend this type of training to their colleagues. 100% felt the training would be improved if there was follow on clinical training in the operating room with patients. 92% reported this training experience being better than their usual military drill training.

Conclusion Based on the results, the majority of participants believed the session was of great value and would enhance their ability to treat patients in the field and far-forward-front. All participants would

recommend this training to their colleagues which is a strong endorsement of the training session. All participants felt that a follow on clinical session in the operating room would be of great value and it is our intention to build such clinical experience into future training scenarios.

Note: These views represent those of the authors and are not intended to represent those of the US Air Force or Department of Veterans Affairs

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A Simulation Course in Anesthesia Subspecialties

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Introduction Simulation is increasingly important in medical education (1). Studies have underscored the utility of human simulation in training physicians in anesthesiology (2). However, objective evaluations of educational outcomes related to simulation instruction in anesthesia have shown mixed results (3). We instituted a simulation course for fourth year medical students who rotate through the one-month elective in anesthesiology at the University of Pittsburgh Medical Center. The objective of the course is to expand the students' knowledge base, improve decision-making skills and provide consistency for a rotation that is conducted at numerous, diverse clinical sites.

Methods Four simulation sessions are provided to the fourth-year medical students rotating on the anesthesiology service. These include:

1. A proposed prostate surgery, in a patient with congestive heart failure.
2. A case of increased intracranial pressure with a preoperative seizure.
3. A Cesarean section in a patient with a failed epidural and a difficult airway.
4. Thoracic anesthesia, including insertion of a double-lumen endotracheal tube.

Each scenario is conducted by two faculty instructors, and each is preceded by a 30 minute didactic presentation. Students then manage the case one-on-one, or in groups of two, with an instructor/facilitator in the mock operating room, utilizing a SimMan computerized human simulation mannequin (Laerdahl Corporation).

Results A total of 16 students have taken the elective in the first seven months of this academic year. Students were asked to evaluate the course using a scale of 1 to 5, with 5 representing the most positive response. The average student response to "This course met my expectations" was 4.94. Likewise, in responding to the query "I plan to utilize what I learned [in this course] in the future," an average rating of 4.94 was obtained.

Discussion This simulation course has significantly enhanced the educational experience of medical students taking the fourth-year elective in anesthesiology, both by exposing student to subspecialty information not routinely taught at their clinical sites, and by adding consistency to their anesthesia experiences. Future studies will measure the impact of simulation on student performance and knowledge base.

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MSC in Evidence Based Anaesthesia: a Useful Qualification?

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Introduction The skills required to practice evidence based medicine, in particular the ability to locate, appraise and implement evidence, are not routinely included in postgraduate anesthesia training in the UK. To address this, the University of Teesside introduced a Masters degree course in Evidence Based Anaesthesia in 2001. The aims of the course are to provide students with the skills necessary to apply evidence based practice to their own area of anaesthetic interest, to develop an understanding of the methodologies and practicalities involved in conducting research and to foster an inquisitive approach to clinical practice. The course is run concurrently with full time anaesthetic training and comprises seven modules. A variety of teaching methods are employed including tutorials, distance learning, private study and evening lectures.

Methods To investigate the success of the course in achieving its aims a questionnaire survey was conducted of all participating anaesthetic trainees since the inception of the course two years ago.

Results Of the ten anaesthetic trainees enrolled seven responded. Reasons given for enrolling on the course included a desire to learn about evidence based practice, in particular how to find and appraise evidence, to achieve a higher degree for the benefit of personal development and to acquire knowledge and experience in research methodology. Most students found the content of the modules both interesting and useful; however three students found the content of one module useful but not interesting. Of the second year students, all had deferred between one and five modules and the most common reason for this was lack of time. All except one first year student felt the course had affected their practice in some way. Most students felt they had become more critical in their appraisal of research literature, some found they were more critical of their practice in general and one student thought it would encourage further research activity in the future. All students would recommend the course to a colleague although emphasizing the work and commitment involved. Lack of time was a major problem for several of the students and recommendations for improvements included extending the course to three years and incorporating time off from clinical duties to complete course work.

Discussion The results of the survey suggest that the course is achieving its aims with the majority of students stating they are now more rigorous in their use of evidence within anaesthetic practice. Clearly there are difficulties that must be addressed, particularly regarding time, however the course is undergoing

constant development and we are optimistic for the future success of this initiative.

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The Use of a Time & Attendance Badge Reader System to Audit Resident Work Hours

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Introduction The ACGME requires residency program and GME institutional oversight of resident work hours. Some programs perform intermittent surveillance audits using written reporting logs. Strict work hours limits and consequences of exceeding them mandate accurate reporting. Because written logs completed retrospectively may suffer from recall bias, we sought to capture contemporaneous work -start/-end time data. Many specialties (e.g. anesthesiology) involve minimal or no at-home consultation pager call, restricting resident “work” to all in-hospital training activities. Therefore, a system that captures hospital entry and exit times would suffice. Most hospitals have time and attendance systems that use identification (ID) badge readers for staff payroll purposes. Such badge readers recognize ID badges by means of magnetic strip slide-through. We sought to determine whether such ID badge reader systems could be used to audit resident work hours.

Methods The time and attendance system used at Vanderbilt University Medical Center (Matrix Systems, Inc., Dayton, OH) was used to track anesthesiology resident hospital entry & exit times. Badge readers are located at hospital and locker room entrances. Resident ID numbers were entered into the system. Three 2-week (14-day) work hours audits were conducted. **Audit 1** (Nov ‘02) required use of Matrix badge reader only, and was announced at a resident meeting; reminders were not provided. **Audit 2** (Dec ‘02) required written logs in addition to ID badge swiping and was announced at a resident meeting. Also, reminders were provided during the audit period. Results of individual audits (1 & 2) were sent to each resident with a **Survey** exploring barriers to unsuccessful completion of audits, and audit method preference (log vs badge reader). The final audit, **Audit 3** (Mar ‘03), badge swiping and written logs, included frequent and prominent reminders. Each week was scored for completeness of recording for each resident (Scoring Scheme). Residents with perfect Matrix entries (P) during Audit 1 were excused from Audit 2 only; these weeks, and all vacation weeks, were excluded from analysis.

Results All residents (39) participated. Written logs were submitted by 10 (26%) and 37 (95%) in Audit 2 and 3. One-week audit scores are presented ([Table 1](#)). Time entry completeness improved dramatically over time ([Figure 1](#)). Matrix entries were complete/near complete (P+P/L) in 26% & 63% in Audits 2 & 3. Surveys were completed by 24 (62%) of residents, who identified reasons for incomplete time entry: difficulty remembering to swipe (88%), not informed in advance (33%), underestimated importance of audit (33%), thought badge-swiping demeaning (13%), and inaccessibility of badge readers (13%). The preferred method of audit was written logbook for 58% of respondents and Matrix reader for 33%. Residents rounded Audit 3 written logbook times to nearest 5 min (11%), 10’(16%), 15’(41%), 30’(16%), and 1 hr (11%).

Time Entry Completion Scoring Scheme for each week:

- P** – Perfect: All times entered, data from Matrix alone
- P/L** – Perfect: All times entered, data from Matrix + Log
- L** – Perfect: All times entered, data from Log only
- N** – Near Perfect: Missing only 1 time entry
- I** – Imperfect: Missing only 2 time entries
- F** – Fail: > 2 missing entries
- B** – Blank: No reporting
- E** – Excused (“P” scores during Audit 1)

Discussion Although its primary purpose is hospital staff payroll, time & attendance systems (ID badge readers) may facilitate surveillance of compliance with resident work hours limits by capturing contemporaneous hospital in-/out-times. Accuracy and completeness may be increased with addition of written logbooks, although rounding of times suggests retrospective completion of logbooks, which may introduce recall bias. Performance may also be improved by thorough advanced communication to residents and continual reminders throughout the audit period.

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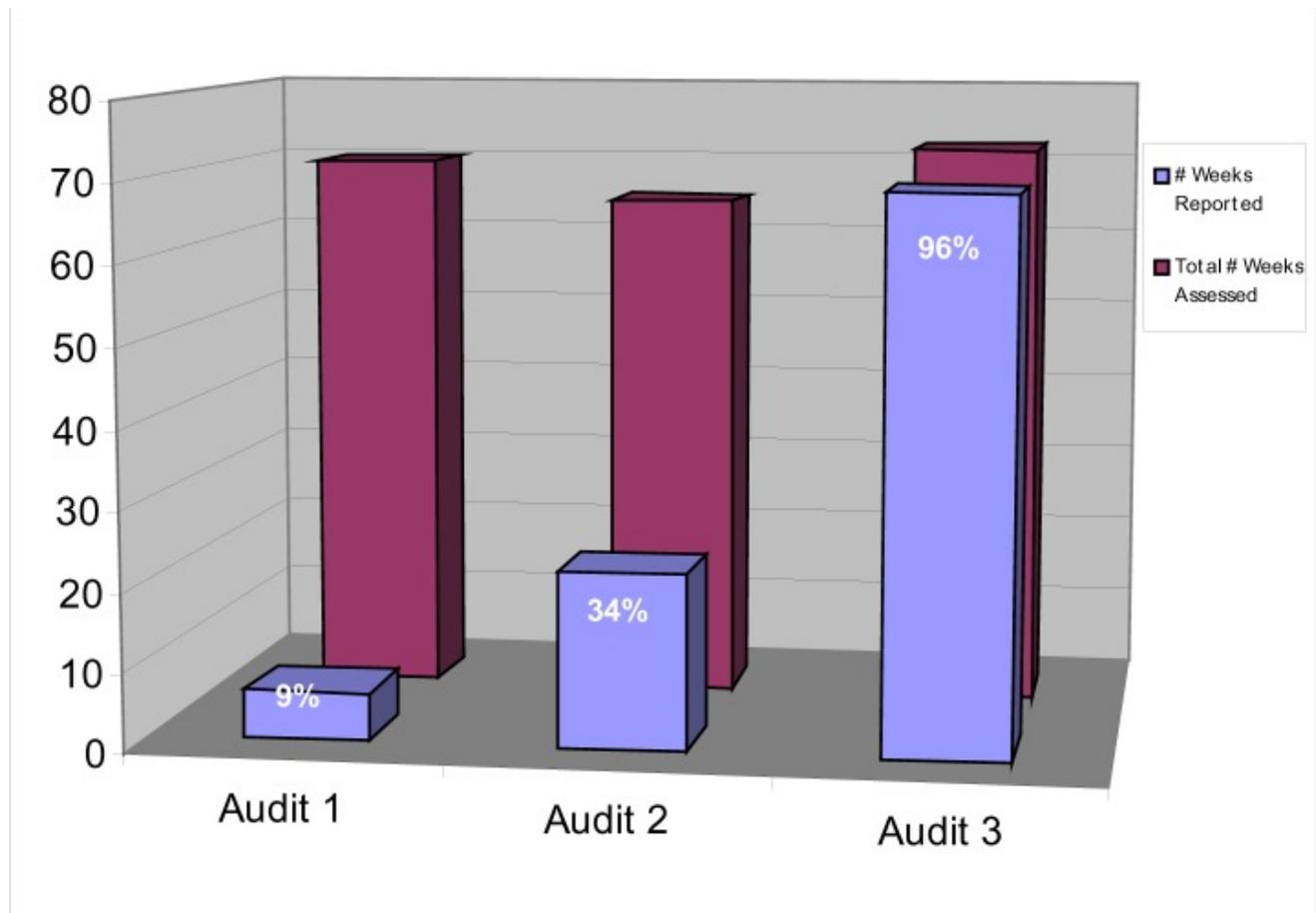
Figures and Tables

Table 1

One-week audit scores

	Audit 1	Audit 2	Audit 3
P	6	14	1
P/L	0	3	34
L	0	5	24
N	5	8	0
I	10	9	0
F	22	12	1
B	27	16	2
E	0	8	0
V	8	5	6
P+P/L+L	6	22	69
TOTAL	70	65	72
%P,P/L,L	9%	34%	69%

Figure 1



Number of completely recorded weeks vs number of weeks assessed in three work hours audits.

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A Study to Compare Two Non-Anatomical Models as Tools for Learning Fibreoptic Bronchoscopy with Study Participants Acting as Bronchoscopic Subjects

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Introduction Demonstration of endoscopic skill transfer from models to the clinical environment suggests that it may no longer be acceptable to learn basic endoscopic skills on patients. The use of endoscopy course participants as subjects for bronchoscopy has been described.¹ As part of a similar course being developed in our Institution, we conducted a study to compare the bronchoscopy skills of subjects trained on two non-anatomical models. A 'Choose the Hole' model² was compared to Dexter™³, which is a modular endoscopic dexterity system designed to encourage self-tuition and practice. We hypothesised that the design features of Dexter™ would encourage study participants to practise and result in superior bronchoscopy skills.

Methods 43 subjects were recruited from within the Department of Anaesthesia. After initial didactic teaching, endoscopic performance was measured on an anatomic manikin. All endoscopic attempts were

videotaped, and both quantitative (times) and qualitative (Global Rating Score) scores were recorded by independent blinded observers. Participants were matched and randomised to undergo a 2 week self directed training period on either the 'Choose the Hole' or the Dexter™ models. Each participant then performed 5 recorded bronchoscopies on fellow participants and was in turn topicalised (lignocaine 8-10mg/kg) and bronchoscoped five times. A study questionnaire using 10 point visual analogue scales was subsequently sent to all subjects.

Results Quantitative and qualitative measures of clinical performance were significantly better in the Dexter™ group. Mean (SD) endoscopy time from mouth to carina was 29.7(7.6) seconds Vs 40.6(19.3) ($p = 0.02$). Mean(SD)Global Rating Score 3.0(0.4) Vs 2.6(0.6) ($p = 0.04$) Participants spent longer training on Dexter™(181.2min Vs 98.7min; $p = 0.01$) and found it more useful(VAS 8.0 Vs 4.1 , $p = 0.001$), effective(VAS 7.4 Vs 4.5, $p = 0.001$) and interesting (VAS 7.4 Vs 2.1, $p=0.001$) than 'Choose the Hole'. 39/40 participants performed clinical endoscopy from mouth to carina in under a minute.

Discussion Both models are useful tools for learning the psychomotor skills required for fiberoptic bronchoscopy. The superior clinical skills of the Dexter™ group support the hypothesis that the model encourages effective practice. Combined with an anatomic manikin and didactic teaching, proficient clinical bronchoscopy was achieved without recourse to a clinical learning curve.

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OB Anesthesia Simulator Teaching for Medical Students

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Introduction This project examines medical knowledge acquisition of medical students completing a senior elective in anesthesiology as it relates to the performance of anesthesia for urgent cesarean delivery utilizing a patient simulator. Simulator based training provides a more comprehensive learning environment and subsequently results in faster, more complete acquisition of necessary skills and mental preparation. The objective is to show that the medical students have an improved knowledge in managing an urgent cesarean delivery after participating in the OB anesthesia simulation.

Methods The students are asked to complete a 0-5 point scale with "0" being no knowledge and "5" being

complete knowledge, on the anesthetic management of an urgent cesarean delivery. A 30-minute power point presentation on obstetrical anesthesia is then given. Afterwards, each student engages in the care of a simulated patient with a poorly functioning labor epidural and subsequent fetal decelerations requiring an urgent cesarean delivery. All scenarios take place in the simulation center, utilizing a mock operating room and SimMan ®.

Results The results are based on 20 students going through the simulation this past year. Before completion of the simulation, the median rating on the scale was a 1 (range = 0-2). After completion of the simulation, the median rating was a 4 (range = 3-4).

Discussion The medical students reported that they improved their knowledge in managing an urgent cesarean delivery after learning in the simulator. However, we believe significant changes to the methods used to evaluate this teaching activity is necessary before true comparisons are available. This teaching scenario could form the basis for an examination of teaching evaluation tools and their applicability in medical student education.

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Follow-up Study after Crisis Resource Management (CRM) Training

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Background 10,000 hospital deaths occur each year in the United States due to health care provider error (ref IOM). In an effort to minimize these errors, simulation use has been suggested and is growing as a tool to educate health care providers. Such simulation education includes Crisis Resource Management training (CRM). The Crisis Resource Management course objective is to teach concepts of team and resource management using computerized full human simulators and various “crisis” scenarios. We have been providing Crisis Resource Management training for interdepartmental groups since 1998. We were interested to see if the participants of our training had used the principles of CRM during a crisis. If so, was their CRM training of value? We developed a questionnaire to explore these questions.

Methods Since 1998, we have trained over 250 healthcare workers in the principles of CRM. A particular two hour session might include several nurses, two residents (anesthesia, surgery, internal medicine, pediatrics, cardiology, etc.), a senior anesthesiologist, and one or more medical students.

Following IRB approval, we mailed a questionnaire for participants of the CRM training to ascertain whether or not the training had any impact on their medical or nursing practice behaviors in the period since their CRM training. The questionnaire asked CRM training participants if they had been involved in

a medical crisis since their CRM training. If so, we asked them to describe a specific crisis and to what extent the CRM training had had an effect on their behavior during the crisis.

Results 53 of 149 (35%) questionnaires were returned. 52% of the respondents were male, 40% female. 25 of the respondents were physicians, 25 were nurses, and 3 were students. Most of the participants had been involved in one or more crises since their CRM training. 38 participants (72%) responded that their behavior during crises changed because of their CRM training, either somewhat (21), moderately (12), or significantly (5).

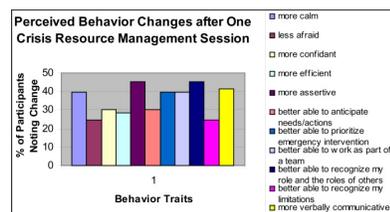
Discussion According to our respondents, the CRM principles are implemented following Crisis Resource Management training. We believe that because trainees use the skills learnt in CRM training, it will help to alleviate some of the causes of poor outcomes and stop the multi-factorial chain of events that often result in disaster.

Based on our data, our CRM training was deemed to be effective in increasing self-reported improvements in feelings of competence, assertiveness and teamwork. Our follow-up study shows us that participants perceive themselves as better health care providers due to CRM training. We believe that patients everywhere would benefit by being cared for by healthcare workers trained in CRM.

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Figures and Tables



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A Transfusion Medicine Teaching Module for Anesthesiology Residents

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Introduction The presentation of a body of knowledge in an organized, appropriate manner over the three-year curriculum of an anesthesiology residency remains both a challenge and an opportunity. The development of a single three-year long didactic curriculum for our residents has led to the creation of “teaching modules”. The development of a teaching module entails basically two parts: identification of the relevant subject matter within the overall topic, and determination of the appropriate teaching method

and timing for each component. We have applied this approach to the teaching of transfusion medicine with positive results. Residents receive instruction in transfusion medicine in a level-specific manner throughout the program using the following teaching modalities:

Lecture Presentations

CA1 Fluid and Electrolyte Replacement Core Lecture

Blood Component Therapy Core Lecture

One Day Blood Bank Clinical Rotation

CA2 Blood Transfusion and Complications Lecture

Massive Transfusion Lecture

Coagulation Cascade and Coagulopathies Lecture

CA3 Alternatives to Allogenic Transfusion Lecture

Blood Substitutes and Pharmacologic Alternatives Lecture

Jehovah's Witness Problem Based Learning Discussion

Problem- Based Learning Discussion Session

Transfusion Decision Making In The OR

Autotransfusion Controversies

Journal Club

Update from International Study Of Peri-operative Transfusion

Influence of PAR- I Receptor on Thrombosis

Visiting Professor Lectures

Pharmacological Attenuation of Excessive Peri-operative Hemorrhage Indications For Transfusion

The development of the transfusion medicine teaching module had enabled us to significantly improve our teaching in this area by creating a structure that expose residents to topics in transfusion throughout their three years. The incorporation of a one day resident clinical rotation in the Blood Bank has directly involved Blood Bank personnel in resident teaching, improved communication between the Blood Bank and our Department and given residents a hands-on appreciation for the timing and complexity of transfusion related procedures.

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Encouraging Expertise in the Use of Monitoring

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Introduction Electronic monitoring is essential for patient safety in anesthesia.

However, formal sources of anesthetic knowledge such as textbooks and instruction manuals deal with monitoring in terms of technical specifications and performance characteristics. Accounts of monitoring design often fail to acknowledge the potential for misunderstanding which monitoring can also bring [1].

Methods After local Research Ethics Committee approval, we observed anesthesiologists at work in the operating theatre and interviewed a range of anaesthetic staff about the role of knowledge and expertise in practice [2]. Transcripts were analysed for recurring themes. Here we present data relevant to the issue of monitoring.

Results Many experienced practitioners emphasized clinical observation of the anesthetised patient as the prime source of information. Some trainees adopted this way of thinking rapidly, but others seemed to put greater trust in technology (for instance, looking at expired CO₂ instead of the patient's chest to confirm successful placement of a laryngeal mask airway). Furthermore, abnormal readings, alarms and artefacts are very common even if nothing is wrong with the patient [3]. Trainees need to learn when it is right to 'ignore' a reading and when action is required, and how to seek the additional information they need to make such judgements.

Discussion and recommendations We offer the following educational strategy for helping residents and other anesthetic staff make monitoring technology 'work' in practice.

Talking Experienced practitioners can help simply by talking about what they do. Verbalizing how they are thinking as they balance different sources of knowledge about the patient 'unlocks' their experience and makes it available for learning. Anecdotes from practice ('cautionary tales') can also provide vivid and memorable learning points.

Questioning Directed questions help trainees learn for themselves. For instance: 'Do you prefer clinical signs, or electronic monitoring?' 'Is there a 'hierarchy of knowledge' where you favour one form over another?' 'Does this hierarchy vary depending on the situation?' 'What's going through your mind when you look at that monitoring screen?' 'Did that reading surprise you in view of what just happened?'

Practical exercises Count the number of false positives and false negatives during an operating session (where monitors suggested something was wrong when it wasn't, and vice versa). Try to use published data to calculate the 'number needed to monitor' (the number of patients you would have to monitor with a given modality to prevent a given adverse event).

Reflect on previous incidents: when things have gone wrong in the past, what was it that first alerted you to problems? Analysis of departmental critical incident reports could also be used to gather such information. Create the opportunity for trainees to give anesthetics (when working with seniors) (1) without being able to see the monitor screen and (2) without being able to see the patient.

Acknowledgments

Acknowledgments We would like to thank the anaesthetic staff who took part in the study, their patients and David Greaves.

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Changes in Delivery of Obstetric Anesthetic Practice, and it's Effect on Training Doctors at a UK District General Hospital, 1984-2002

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A safe service delivered by anaesthetic residents in training, which gave them good clinical experience has given way to a service which is less satisfactory clinically, and less satisfactory for training, but the residents have much better prospects of promotion. Modular experimental training requires careful organization, to ensure competence is obtained.

Introduction In the field of anaesthesia, the expansion of numbers of consultant and associated specialists has improved the career prospects of trainees. However, paradoxically, the case load and experience that the residents receive has now diminished to the point where it can be difficult for the resident to acquire adequate training experience. Concurrently, the quality of the service to the patients has deteriorated.

Method Obstetric anaesthesia is largely procedure based, and anaesthetic experience and practice for trainees and consultants were analyzed by reference to the Maternal Epidural and Theatre Records.

Results In 1984, anaesthetic residents at our hospital performed 75% of the maternity anaesthetic case load. In a 4 month period, they would perform 20 epidurals, and 20 obstetric anaesthetics. The accidental lumbar puncture rate was .05%. However, from that year, no residents were ever promoted to become consultants.

By 1993, career grade expansion had caused the workload born by the residents to fall to only 45%. In a 4 month period, an anaesthetic resident would perform 10 epidurals and 12 obstetric anaesthetics, and the accidental lumbar puncture rate with epidurals had risen to 1%. However 7 of the 14 residents have been promoted to consultants.

By 2002, consultant expansion had leveled off, and the residents are all predicted to become consultants. The residents performed 54% of the workload and in a four month period performed 6 epidurals and 5 anaesthetics. The Accidental lumbar puncture rate was 1.3%.

Conclusion Similar trends(1) have been observed in other UK hospitals. It is likely that similar changes have occurred in other specialties with the implementation of modular training. These findings suggest that

it is essential that modular training is carefully organized to ensure that the training has taken place, and that competence has been acquired.

This presentation also suggests how this may be done.

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Timely Feedback for Residents' Clinical Performance through Web-based Evaluations

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Introduction Feedback is essential to learning because it provides learners' with the opportunity to evaluate their learning and learning strategies (National Research Council, 2000). Feedback can also increase the learner's motivation by satisfying the intrinsic human need to understand how we are doing (Clifford, 1990). However, to be effective feedback must be timely (Rosenshine & Stevens, 1986). Researchers have found that immediate feedback can actually boost achievement (Crooks, 1988; Kulik & Kulik, 1988).

Feedback is especially important in a medical residency where teaching and learning has a direct impact on patient care. Despite its importance, Irby (1994) has characterized feedback in clinical settings as an "intractable problem." Here we present one approach to alleviating that problem.

Methods Our residency program has constructed a web-based evaluation system that automatically emails faculty members each time they work with a resident. The email contains a link to an online clinical evaluation, which consists of six criteria related to the ACGME core competencies. The faculty evaluates residents on a four-point scale and makes additional comments as needed. The evaluation is submitted to a database and quickly becomes available for resident review. Password protection ensures the evaluations remain confidential.

Formerly, clinical evaluations were done on small cards that could be lost or put in a desk drawer and forgotten. The new electronic system avoids these problems because the email waits patiently in the faculty inbox until they fill it out. Drop down menus allow a secretary to prepare evaluation forms for 40 faculty members in 10 minutes or less and evaluation returns are automatically tabulated.

Results The new system has been in effect for nine months and has been an unqualified success. Faculty evaluation returns have increased significantly, residents are able to review evaluations in a timely manner, paperwork has been reduced, and the evaluation database allows for the generation of useful reports.

Nine faculty members [from a faculty of 41] have increased their response by 30% or more with some increases as much as 70%. One faculty member whose response rate jumped 40% claims the new system is "phenomenal, very quick and easy to use." Another faculty member appreciates the convenience of the

email system and says, "It's kind of a friendly reminder." Convenience seems to be the primary reason for the increased response rate.

Informal conversations with residents indicate that they appreciate the opportunity to see the evaluations in a timely manner. Previously residents reviewed the evaluation cards every six months and as one resident said, "You didn't know if evaluations were from yesterday or four months ago." The new system removes some of the mystery in the evaluation process.

Discussion While this system provides obvious benefits for the individual resident, it also benefits the residency program. 'Red flag' parameters can be set in the evaluation system to automatically notify the program director via email so that potential problems can be addressed early. Database reports can be reviewed to determine if residents are having difficulty with particular faculty members or types of cases. Finally, six-month evaluations can be automatically sent to those faculty members who have worked with a resident a predetermined minimum number of times giving more validity to long-term assessments.

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Simulator CME for Family Practice Anesthetists: a Nationwide Program

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Introduction Family practice anaesthetists (FPAs) are essential to health care delivery in Canada, but have an average practice lifespan of approximately 5 years¹, in part due to an isolated environment and lack of specific CME programs. A national collaborative effort has addressed this deficiency.

Methods A meeting regarding FPAs was held in Kananaskis, Alberta, in November 2001, and included representatives from all 8 high fidelity human patient simulation centers in Canada. Details regarding

learning objectives, administration and financing of a national simulation based CME program were discussed. Subsequently, a need assessment was performed, specific scenarios were developed and tested, and brochures were printed and circulated. The most stringent category of continuing medical education credits for a one day standardized workshop were obtained from the College of Family Physicians of Canada. A further teleconference was held to finalize details.

Results The first workshops were held in 2 Canadian centers (Edmonton n=4, Toronto n=6) in fall 2002. Interest in the community is high and future courses have been booked. Course evaluations are summarized in [Table 1](#).

Discussion Through a national collaborative, a simulator based CME program for FPAs was developed and implemented. Initial evaluations have been very positive. The objectives of this program included the provision of a hands-on educational experience and the forging of relationships between FPAs and academic centers. It is hoped that these relationships will lessen the isolation of FPAs and promote longer practice life spans. Ongoing evaluation and reporting of this program is planned.

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Figures and Tables

Table 1

Course evaluations from the first 2 workshops.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The simulated scenarios were relevant to FP Anaesthetists.			1	1	8
The simulated scenarios were adequately realistic.				5	5
The debriefing sessions were important learning opportunities.				3	7
The course enhanced my understanding of how to handle critical incidents and crisis situations.			1	3	6
The skills taught in the course are easily transferable to my practice.				5	5
I would recommend this course to other family practice anaesthetists.			1	3	6
The course was organized and well designed.				2	8
This course was an important component of my professional development.			1	4	5
The registration fee was reasonable.			5	4	1

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Active Learning Intervention Evaluated with a Cognitive Behavior

Survey, Performance Assessment, Multiple Choice and Short Answer Questions

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Background Adult learners are more satisfied, learn more and develop life long learning skills during active learning interactions. Problem based learning discussion (PBLD) requires less faculty time which is beneficial since faculty time is very limited. Traditionally the Clinical Anesthesiology-1 (CA-1) Residents have a curriculum consisting of 15-20 lectures about various topics during the first month of residency. After surveying the Faculty about the ten most important topics a cross over study was designed to incorporate and evaluate active learning with IRB approval.

Methods The curriculum was redesigned to use the same amount of contact time as the previous years. Ten University of Arizona CA-1 Residents were evenly divided into two groups. Each resident completed the Cognitive Behavior Survey (CBS). Week one both groups participated in a PBLD in order to familiarize each resident with the process. The groups crossed over between lecture and PBLD during weeks 2 and 3. During week 4 the two groups participated in a simulator (METI model C Sarasota, FL) training session for 4 hours of contact time and worked through 15 scenarios of critical events to achieve pattern recognition, intervention and rule-based skills. At the end of weeks 1, 2 and 3 the residents completed pre- and post-tests consisting of multiple choice and short answer questions. At the end of week 4 each resident was videotaped during two scenarios. The evaluation checklist consisted of skills and time to recognition, diagnosis, and treatment of critical events. Anesthesia Knowledge Test (AKT) was administered on days 1 and 31. All of the evaluation tool data were analyzed with the paired-t test. Results. The group uniformly scored low on the reflection scale on the CBS. Only one resident scored high on the memorization (M) and low on the conceptual (C) scale. One resident scored the opposite. Two residents scored intermediate on both of the scales. Three residents scored high on M and intermediate on the C scales. Three residents scored high on both scales. Two residents scored intermediate on the positive learning experience scale. None of the evaluation tools showed statistical significance for a difference between the two groups.

Conclusion The CBS serves as a tool to identify the resident who might have difficulty with the Anesthesiology curriculum because he/she has a high memorization and low conceptualization score which hinders learning and application of mechanisms. The conceptual learner uses the active learning process where he or she is engaged in constructing an understanding of the material. The memorization learner uses rote for a passive learning mode. Positive learning experience scale correlates positively with the conceptualization scale but negative with the memorization scale. The quality of the learning experience is influenced by the cognitive processes the learner selects to use. Therefore, the curriculum shapes the learning environment in terms of the types of cognitive processes learners adopt as a response to the cognitive expectations of the curriculum. The simulator sessions and PBLD are examples of interactions where conceptualization is emphasized. The active learning intervention has not changed the outcome of the evaluation of the resident's progress through performance evaluation, short answer, and standardized multiple-choice questions.

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Changing Curriculum and How the Naïve Learner Responds to Intervention

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Background Month One of Anesthesiology Residency training usually consists of fifteen to twenty lectures about various topics in Anesthesiology. An active learning curriculum proposal needs to have approximately ten topics incorporated. In a shift to active learning the Faculty and Clinical Anesthesiology Residents were surveyed to find out what ten topics are the most important during the first month.

Methods The participants ranked from 1-15 the fifteen lectures that had been used in the past curriculum using one as the most important topic and fifteen the least important topic. The participants also rated each topic separately as to the utility of the information during month one of Anesthesiology training on a Likert scale of 1-5 with one being not useful and 5 being extremely useful. The active learning curriculum was instituted for the new class of CA-I residents. One year from the original survey, CA-1 and CA-2 residents completed the same survey.

Results A Wilcoxon-signed Rank test was applied to the data. The Faculty ranked in order of importance airway, muscle relaxants, fluid management, opioids, inhaled anesthetics, intravenous anesthetics, PACU, local anesthetics, acute pain and regional anesthesia. The 2002 CA-1 ranked acute pain and pediatric anesthesia in a statistically opposite ranking from the Faculty. One year later the same group only ranked ambulatory anesthesia opposite from the Faculty. The 2003 CA-1 group ranked PACU, trauma anesthesia and anesthesia in remote locations opposite from the Faculty. The Faculty showed consistency between the ranking and rating of the topics. The 2002 CA-1 group was inconsistent with ranking and rating of the topics however ranked the topics in a similar order, as did the Faculty. One year later the 2003 CA-2 group showed better consistency between the ranking and rating of the topics. They ranked the topics in the same order as the Faculty. The 2003 CA-1 residents who completed the active learning intervention ranked the topics in a similar fashion as the group from one year earlier but were more consistent with the rating and ranking of each topic.

Conclusion The inconsistency of the 2002 CA-1 Residents can be attributed to the naïve learner theory where the learner is not using the same criteria of utility as the Faculty. The theory is confirmed by the data from one year later where the ranking and consistency become similar to the Faculty results. The 2003 CA-1 Residents ranked the topics in a similar fashion as did their colleagues however this group was more consistent in rating and ranking the topics. It is unclear whether the active learning intervention influenced their decision making process.

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Does Your Systems-Based Practice Promote Physician Burnout?

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Introduction With implementation of the ACGME Core Competencies, academic programs are looking at residency training differently. For instance, the Systems-Based Practice Core Competency looks at the residents' ability to integrate their patient care into the existing health care system(s) of their training program. Likewise, it affords us the opportunity to have a 360-degree approach to evaluate our systems; i.e., are we ensuring that mechanisms are in place to promote an environment conducive to practicing medicine safely and efficiently. Other authors have evaluated the level of stress in various physician training programs.^{1,2,3} Our pilot study looks at the perception of resident-physician burnout, triggering mechanisms, and awareness of avenues to wellness in an attempt to identify any contributing factors that may be rectified system wide.

Methods In a personal interview respondents verbally answered a questionnaire. The questionnaire was designed with open-ended questions to facilitate candid discussions between interviewer and respondent. A total of 14 residents from 6 specialties (surgery, plastics, orthopedics, anesthesiology, OB/GYN, medicine) were interviewed all from our institution. Participation was voluntary and in line with institutional survey policy.

Results Self-described burnout affected 64% of the respondents with 67% of these occurring during their PGY-1 year. Additionally, 79% of respondents placing the surgical specialties at highest risk. Indicators are shown in [Table 1](#). Interviewees identified the items in [Table 2](#) as system-based problems that promote stress/burnout. In addressing avenues to wellness, 57% of the respondents felt there were no system-based support programs. However, 78% of the respondents felt they could seek assistance from their program director when dealing with burnout/stress concerns. Of interest, over half of respondents felt that there is a preconceived notion of burnout being seen as a sign of failure and/or weakness. This often inhibits the physician from not only accepting burnout but also seeking assistance. This is indicative of the 92% response from those who would not seek peer support. We have an Employee Assistance Program that offers counseling at no cost. However, utilization of this program has been minimal; zero among the respondents.

Discussion As we work toward incorporating Systems-Based Practice competencies as well as Practice-Based Improvement skills among our trainees, we are afforded the opportunity to improve our system of delivering healthcare that can minimize burnout and stresses to the physicians. While residents of all levels

of training reported symptoms of stress and burnout, it was highest among those earliest in their training. We should consider evaluating the transition from medical student to resident to identify ways to modulate the degree of accountability that either prepares the medical students for the transition, or develop gradations during the PGY-1 year that are responsive to the experience of the trainee. We need to cultivate an environment free of misconceptions of stress and burnout, as well as provide the tools to address them. The “when I was a resident...” bracing up is no longer acceptable in the approach to these issues. The ACGME work limitations of both the 80-hr workweek and the one in seven day off will do much to alleviate the effects of sleep deprivation and fatigue factors contributing to stress and burnout. However, each healthcare system should evaluate its often unseen contributions to stress development.

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Figures and Tables

Table 1

Frequency of identification of signs of stress

Indicators of stress and burnout	Frequency of identification
Irritability	13
Lack of engagement/apathy	17
Poor work performance	5
Marital status	0
Personality type	10
Fatigue/sleep disturbance	5

Table 2

System-based contributions to stress and burnout

Contributing Factors	Frequency of identification
Work hours	10
Patient load	5
Paperwork	6
Patient complexity	6

Course on Teaching & Learning for Hospital Doctors

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Introduction In the winter of 1995/96, the South Coast Training Group (SCTG), was formed by five anaesthetists with an interest in medical education. The aim was to set up and run a Primary FRCA Course. This planned seven day Primary Course was to compliment an already running day release course in the region. However, the SCTG course would be run with a difference. All who would teach on it would have been on a Teaching the Teachers Course. The Royal College of Surgeons have been running two day Teaching the Teachers Courses and ATLS Instructors Courses centrally with great success. Inquiries were made at the Royal College of Anaesthetists and it was clear that no such courses were being run by the College. Therefore it was decided a teaching and learning course would be run by the SCTG. Initially this was for our own teachers but its success lead to it being advertised nationally by mail sent to the College Tutors in each Hospital.

Methods What did the SCTG need? Firstly, an educator was co-opted who had vast experience in medical education. Secondly, appropriate facilities were found in the Post Graduate Centre of Eastbourne Hospital for this teaching course. Two rooms capable of seating up to ten participants were needed, an overhead projector and an xray screen. The Hospital Medical Photographer was required to video the afternoon session on the first day. Refreshments would be required during the two days together with accommodation and a course dinner at a local hotel. A maximum of nine participants are accepted on each course with a minimum of six. The course was initially open to Consultants and Post Fellowship SpRs but is now open to SHOs and above. The courses are designed to be highly practical yet provide opportunities to consider educational theory and principles on which to base one's teaching. The participants practice and develop their educational skills for giving lectures and making formal presentations on the first day and this is videoed and feedback given. Teaching in small groups and one to one practical skills teaching is emphasized on the second day. Participants also consider ways of providing constructive feedback to trainees on their performance and progress. One whole session on the second day is devoted to understanding the procedures underpinning appraisal and assessment. The programme is flexible and can be modified to accommodate participants' needs. Relevant handouts are given during the course.

Results Twelve courses have been run to date involving 84 participants (41 Consultants, 36 SpRs, 4 Staff Grades and 3 SHOs). All the teachers on the SCTG Primary FRCA Course have attended this teaching course. Feedback from each Teaching the Teachers Course has been fed into the structure of subsequent courses.

Discussion Initially there were problems in convincing some lecturers of the importance of attending this course. Now its educational value is well established and the course is mandatory for all SpRs attending the two hospitals but also for all teachers on the SCTG's Primary FRCA Course. The feedback from the Primary FRCA Course suggests that the input from the Teaching the Teachers Course has improved the quality of lecturing. Since this course has started the College of Anaesthetists has started running similar courses of its own.

Continuing Education and New Zealand Anaesthetists: an Analysis of Current Practice and Future Needs

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Introduction A survey of New Zealand Specialist anaesthetists was undertaken as the first step in the revision of the continuing education (CE) program. We aimed to identify the current pattern of participation in CE, the comparative usefulness of these activities as perceived by respondents and change in practice as a result of participation. Motivators and barriers to participation were evaluated. The survey aimed to identify the desired format, content and overall direction of CE of New Zealand anaesthetists.

Method The survey contained a mix of open and categorical questions. Mixed model two-way analysis of variance was used to compare ratings of different CE activities and Chi squared test was used for differences in proportions of groups. Written responses were coded into themes.

Results A total of 292 of the 393 active vocationally registered anaesthetists in NZ responded to the survey (74%). Almost all respondents answered each categorical question.

On average, specialists took part in 4.5 different types of meeting or other formal CE activity over the preceding 2 years. There were significant differences ($p < .0001$) in the ratings for usefulness of these activities with interactive courses rated more highly than conferences. ([Table one](#)). Respondents identified specific CME activities that had changed their practice.

At conferences, anaesthetists valued interactive, relevant, practical sessions, refreshers and updates. Expert, high quality speakers were also highly valued as were presentations outside their scope of practice. Debates, panel discussions, controversies, small group discussions, problem based sessions and workshops were preferred formats. ([Figure one](#).)

In reference to written educational material, there was a strong preference for clinical updates, reviews, practice guidelines and summaries of important literature. 60% valued an interactive element, with the ability to submit answers for Accreditation programs. Preferences for electronic or paper-based format were equal.

Motivators to participation in CE included accreditation requirements (39%), the need to keep up to date, (36%) internal driving factors such as curiosity, interest, self-esteem and respect, and patient safety issues. (275 responses). Impediments were other commitments, (53%) difficulty getting time off, (29%) funding (20%) and distance to meetings (26%).

For rural anaesthetists, there were trends for lower participation rates, fewer local activities, and more impediments to participation. In particular, distance was more of a problem. ($p = .02$)

Requests for future CE included more interactive, sessions with practical focus. Specific formats and topics were suggested.

Conclusion With a good response rate, this survey provides a snapshot of current practice, usefulness and effectiveness of current CE in New Zealand. Responses reflect and support what is currently known of effective CME activities. [1-3]The identified motivators, impediments and needs of NZ anaesthetists will guide the future development of an effective program of continuing education.

Acknowledgements:

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Figures and Tables

Table 1

The ranking of the different activities by respondents to the questionnaire

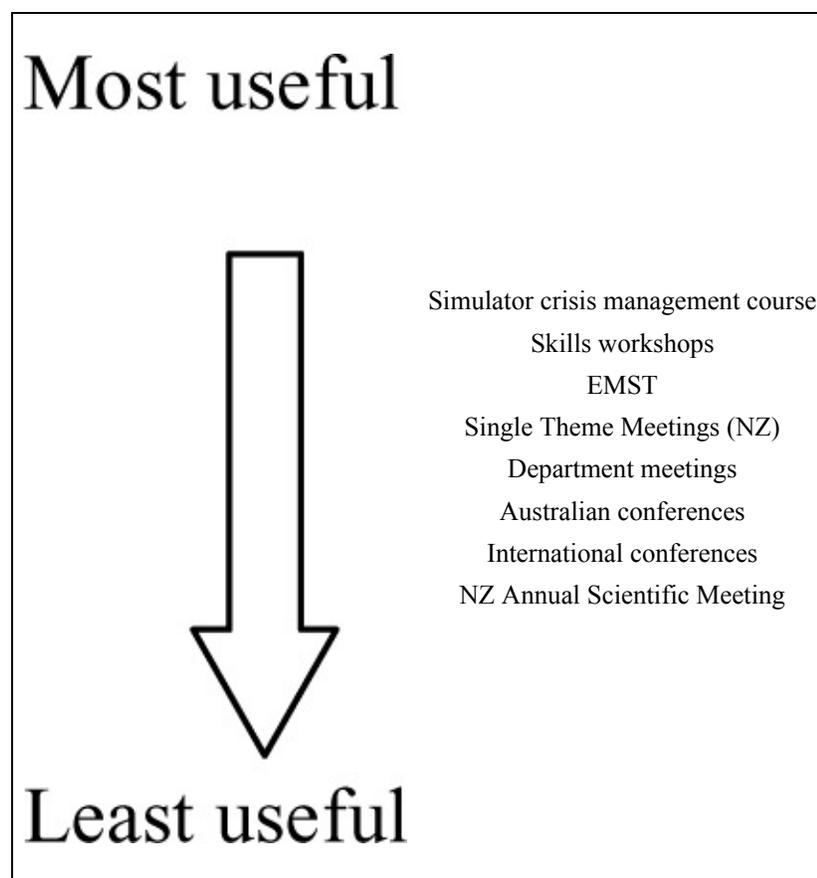
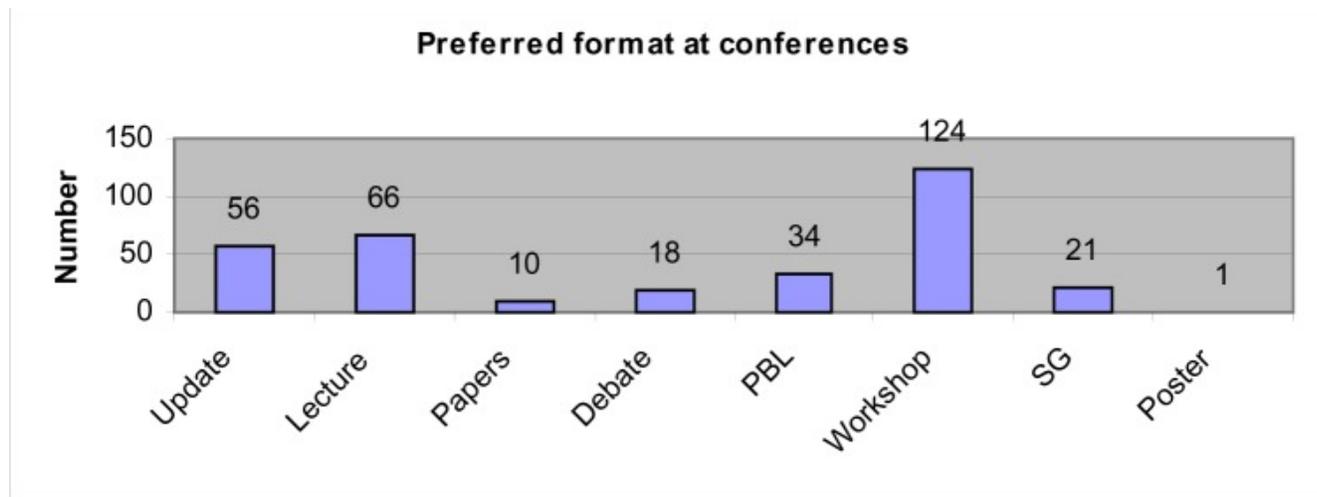


Figure 1



The different methods of delivery of material at conferences preferred by specialist anaesthetists. Update=clinical updates, reviews or refreshers. Lecture= Plenary session, keynote talks, lectures. Papers= Free papers. Debate= Debates, panel discussion, controversies. PBL=discussion based around a problem. Workshop=Workshop on a topic or practical skill. SG: Small group discussion. Poster=Poster session.

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Simulation in Undergraduate Medical Education: Bridging the Gap Between Theory and Practice

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Summary points

- Medical students value simulation-based learning highly.
- Simulation allows application of theoretical knowledge to practice.
- Students can acquire new skills in a safe environment.
- Simulation-based learning aids development of teamwork skills.
- Students can develop a systematic approach to medical emergencies.
- The medium fidelity simulator is a valuable tool for undergraduate education.

Introduction A major challenge for medical undergraduates is the application of their theoretical knowledge to the management of acutely ill patients. Students must learn to be systematic in their approach to a problem, and develop skills to work with the clinical team. However, opportunities for students to develop these attributes are limited in undergraduate training. Can simulation help them achieve these goals?

Simulation-based workshops in crisis management are a popular and effective method of continuing medical education for medical specialists[1]. However, simulation is also widely used in undergraduate medical education. A recent world-wide survey identified 158 simulation centres, many of whom were involved in undergraduate education [2].

Student opinion of simulation-based teaching is generally enthusiastic [3, 4]. However, evidence showing improved learning outcomes is limited and the financial cost is high. Does simulation-based teaching warrant the expense?

The aim of this study was to evaluate the use of simulation-based teaching in the medical undergraduate curriculum in the context of management of medical emergencies using a medium fidelity simulator.

Methods Small groups of medical students attended a simulation workshop on management of medical emergencies. The workshop was evaluated in a post-course questionnaire. All fourth year medical students allocated to the Resuscitation rotation during the first half of 2002.

The main outcome measure was student perceptions of learning outcomes, the value of the simulation in the undergraduate curriculum and their self-assessed improved mastery of workshop material.

Results Thirty-three students attended the workshop and all completed questionnaires. Students rated the workshop highly and found it a valuable learning experience. ([Table one](#))

Twenty one (64%) students identified behavioural skills as key learning points. Eleven (33%) students felt they learnt better how to approach a problem, in particular, the use of a systematic approach. Twelve (36%) felt they learnt better how to apply their theoretical knowledge in a clinical setting.

All 33 students were positive about the use of simulation in their training. Fourteen students wrote that simulation should be used more or should be mandatory in their training. Five students commented positively on the realism of the learning experience and a further 5 said they valued the opportunity to learn new skills in a safe environment.

Study limitations This study has small numbers, (50% of the total class of fourth year medical students for 2002) and is limited to perceptions of participants.

Conclusion This study demonstrates that students value simulation-based learning highly. In particular, they value the opportunity to apply their theoretical knowledge in a safe and realistic setting, to develop teamwork skills and to develop a systematic approach to medical emergencies. A medium fidelity simulator is a valuable educational tool in medical undergraduate education.

Acknowledgments

Acknowledgements Dr. Brian Robinson, Director National Patient Simulation Centre, for assistance in workshops.

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Figures and Tables

Table 1.

Student questionnaire: Total 33 (100%) responses.

Question	Median	IQR	R
Did the instructor create a learning environment in which you felt comfortable?	1	1-2	1-3
How successful was the instructor in encouraging you to work as part of a team?	1	1-2	1-3
Did this session help you to develop confidence to use what you learned in class in the clinical setting?	2	1-2	1-4
Was this session effective in helping you to integrate theory and practice?	1	1-2	1-3
Were the simulations a valuable learning experience?	1	1-2	1-3

IQR=Interquartile Range, R=Range. Rating scale, 1=very much, very effective or very often. 5=not at all, not at all effective or seldom.

Table 2:

Key learning points.

Theme	Number No. (%)	Written comments No. (%)
■ Behavioural issues	21(64%)	29 (48%)
■ Teamwork		15 (25%)
■ Leadership		4 (7%)
■ Task distribution		5 (8%)
■ Communication		3 (5%)
■ Effect of stress/managing stress		2 3%
Approach to problem	11(33%)	12 (20%)
■ Systematic approach to problem		6 (10%)
■ Primary response		4 (7%)
■ Secondary survey		1 (2%)
■ Need to organise response		1 (2%)
■ Need to think broadly		3 5%
■ Need to know the basics		3 5%
Learning to put theory into practice	12 (36%)	12 (20%)
Specific knowledge	7(21%)	10 (17%)
■ Use of a medication		4 (7%)

■ Management of specific problem	3	(5%)
■ Use of Oxygen delivery devices	3	5%

Column 2 =Number (%)of students responding (total 31) to each theme.

Written comments (total 60)= number (%) of comments falling in each theme and subcategory.

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Prototype of an Online, Collaborative Learning Experience Using WebCT to Support

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Introduction Compared with content-based learning, problem-based learning (PBL) environments support learning by introducing the learner to clinical problems and using these problems to teach the underlying principles. Motivation is derived from the satisfaction of solving a clinically relevant problem. Collaborative learning occurs where a team of learners works together on a PBL and supports the social construction of meaning. WebCT is a web-based, integrated educational environment available commercially to institutions as a platform for distance education . The ASA publishes CD-ROMs containing numerous, high-quality PBL modules. PBL sessions have been carried out in face-to-face meetings as well as paper-based exercises (Barrows and Tamblyn, 1980). Recent articles have demonstrated the feasibility of using the Internet to support PBL. Online PBLs have been used to support CME in the areas of geriatric depression (Chan *et al*, 1999), and diabetes (Wiecha and Barrie, 2002).

Methods A prototype of an online PBL environment was created to support collaborative (team) learning using WebCT. It was based on an ASA PBL problem published by Lee Fleisher. Supporting materials were collected from that PBL, other resources and links to the World Wide Web.

Anesthesiology residents are enrolled in the WebCT program. The use of the program is demonstrated to them in groups. After logging on, residents enter the following sequence:

- An introduction to the clinical problem
- A short series of learning objectives
- STEP 1: A single question generated from the clinical problem
- STEP 2: A questionnaire in short essay format for their answer
- STEP 3: A correct' response to the question as written by the original author of the PBL with additional comments written by a local faculty member.
- STEP 4: An introduction to the next part of the clinical problem.
- Steps 1 to 4 are repeated until the end of the clinical problem
- Hypertext links are embedded in numerous areas to allow the resident to investigate the problem further and in more depth.
- Asynchronous, online discussions are carried out to further develop the case using open-ended questions in areas that are 'ill-defined'. These can be entered even after the PBL is completed.

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Improved Evaluation of Anesthesia Resident Performance Using PDAs.

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Introduction The authors were concerned about the need for documentation of the performance of anesthesiology residents, as required by the ACGME. Paper evaluations are both cumbersome, time consuming, and utilize excess storage. We believed that a Palm-based personal digital assistant (PDA) system would be more accepted by the faculty, and would be more suitable for permanent data storage.

Methods Using Pendragon Forms 3.1 (Pendragon Software Corp, Libertyville IL 60048) along with Microsoft Access 2000, a database was developed using parameters the faculty believed were important to evaluating anesthesiology residents. The database is PC based, and the form is then transferred into a Palm operating system using Pendragon Sync Server. Entered data are then transferred back to the server. Employing Sync Server allowed the faculty to use the Palm based PDA of their own choice and made it unnecessary to mandate that all faculty use the same make or model of PDA.

Results Data entered included resident, faculty, patient information, type of operation, and type of surgery. Evaluation included a scaled rating of overall, preoperative, room setup, induction, emergence, and documentation. Also included are scales for intubation, arterial line insertion, and other specific procedures. There are additional categories to write in comments. Finally, the ACGME six competencies are evaluated. Then, there is a window for capturing the resident's signature.

Discussion For about 18 months, a number of faculty have used the Palm-based evaluation to streamline the process and keep permanent records. Using this system, we have been able to collect evaluations at timed intervals. Also, this system allows a fairly detailed evaluation for every case, in compliance with the ACGME goals. In addition, the software is flexible and the evaluation form is readily upgraded. At present, we have added over 3000 evaluations to the database.

References:

1. ACGME Outcome Project: enhancing residency education through outcomes assessment.

