Title: Subspecialty Education in Anesthesia Residency Programs in the United States

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Introduction. It is widely accepted in educational circles that courses designed for health care professionals should have clearly stated learning objectives. These objectives should be based on specific competencies required in the future professional role of the student. They should serve as the framework for a curriculum, and as the basis of any evaluation process. With the growth of the knowledge base and repertoire of clinical skills in anesthesiology, subspecialization within the discipline of anesthesia has emerged. Presently, there is no published data concerning the structure of subspecialty education in current anesthesia residency training programs in the United States. The purpose of this investigation was to determine the extent of subspecialization in teaching institutions and to ascertain the structure of the educational program in the special areas of anesthesia.

Methods. Program directors of 155 accredited residency training programs in the United States were sent a questionnaire concerning the total number of residents and fellows in their program, the number of full-time and part-time faculty, special areas of anesthesia which are taught as block rotations, the number of faculty that spend greater than 50% of their clinical time in special areas, written learning objectives and curricula, and instruments used to evaluate their educational program. Areas of anesthesia listed in the questionnaire were as follows: Ambulatory/outpatient; cardiac; cardiovascular; critical care; neuroanesthesia; obstetrics; pain management; pediatrics; regional anesthesia; thoracic; genitourinary; gynecology; orthopedics; ENT; plastics; opthalmology. Respondents were asked to identify any additional rotations in their programs.

Results. One hundred twenty one (78%) of the 155 accredited residency training programs in anesthesia responded to the questionnaire. One hundred and nineteen residency training programs answered the question concerning faculty number. They reported a total of 2822 full-time and 268 part-time faculty members. Seven of these 119 residency training programs were free standing pediatric anesthesia programs which reported having 74 full-time and 1 part-time faculty member. Sixty six percent of all anesthesia faculty members spend greater than 50% of their clinical practice time in a specific area. One hundred eleven programs (excluding pediatric anesthesia programs) reported having a total of 3329 residents. All of the anesthesia residency training programs that responded to the survey have at least one block rotation. Table 1 lists the most common block rotations, the number of programs that have block rotations in each of the areas, the number of faculty that spend greater than 50% of their clinical time in the area, the number of programs which have written learning objectives, and the number which have written curricula. The table does not include data from programs that specialize in one area of anesthesia.

Table 1. The most common block rotations in anesthesia training programs

Area of Anesthesia	Programs with Block Rotations	Number of Faculty	Programs with Learning Objectives	Programs with Curriculum
Cardiac	113	392	61	56
Critical Care	109	227	58	51
Obstetrics	104	192	62	54
Pediatrics	97	288	49	43
Pain Management	88	133	45	38
Neuroanesthesia	87	149	44	37
Cardiovascular	47	121	30	26
Ambulatory	46	97	25	16

Areas of anesthesia not listed on the survey but identified by the residents as block rotations in their program were: recovery room, burns, radiology, lithotripsy, dental, transplant, consults, monitoring and instrumentation, pulmonary, geriatrics, and research. The ABA/ASA In-training Examination, other written examinations, oral examinations; forms for evaluation of residents, and forms for evaluation of faculty were used to evaluate at least one area of the educational program by 100, 71, 54, 98, and 67 of the respondents respectively.

Discussion. The survey data indicates that subspecialization is widespread in anesthesia residency training programs in that all of the respondents have at least one block rotation, and the majority of anesthesia faculty spend greater than 50% of their clinical practice time in a specialized area. Many programs already have written learning objectives, curricula, and evaluation instruments for special areas of anesthesia. However, not all programs that have written curricula have learning objectives. Without clearly defined learning objectives based on competencies which define an anesthesiologist, it is difficult to conceive how these competencies will be easily achieved by the student. Wider utilization of educational tools, such as learning objectives, should improve the educational process.