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From Academic Medicine When do Supervising Physicians Decide to Entrust Residents with Unsupervised Tasks?



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Abstract and Introduction

Abstract

Purpose Patient-care responsibilities stimulate trainee learning but training may compromise patient safety. The authors investigated factors guiding clinical supervisors' decisions to trust residents with critical patient-care tasks.

Method In a mixed quantitative and qualitative descriptive study carried out at University Medical Center Utrecht, Utrecht, the Netherlands, from March to September 2008, the authors surveyed attending anesthesiologists and resident anesthesiologists regarding when attendings should entrust each of six selected critical tasks to residents. The authors conducted structured interviews with both groups, using trigger case vignettes to solicit opinions on factors that affect entrustment decisions.

Results Thirty-two attending anesthesiologists and 31 residents answered the questionnaire (response rate 58%), and 10 participants from each group were interviewed. Attendings varied in their opinions regarding how much independence to give residents, particularly postgraduate year (PGY) 2, 3, and 4 residents. PGY1 residents reported working above their expected level of competence but estimate their own ability as sufficient, whereas PGY5 residents reported working below their expected level of competence. The authors classified factors that determine entrustment into four groups: characteristics of the resident, the attending, the clinical context, and the critical task.

Conclusions Residents' and attendings' opinions and impressions differ regarding what is expected from residents, what residents actually do, and what residents think they can do safely. The authors list factors affecting why and when supervisors trust residents to proceed without supervision. Future studies should address drivers behind entrustment decisions, correlations with patient outcomes, and tools that enable faculty to justify their entrustment decisions.

Introduction

Deciding when a trainee is ready for unsupervised patient care is not easy. Early unsupervised care can impact the patient's safety, add to the cost of care, and increase liability for the supervisor and/or the organization. In contrast, not enough self-guided and independent decision making may negatively affect the trainee's learning curve and timely achievement of competence. In competency-driven postgraduate medical training, residents must combine learning new and critical materials with taking increasing responsibility for safe patient care.^[1,2] Learning cannot occur without a first time to independently perform procedures

and make decisions. One way to approach this dilemma is to instate a number of critical procedure attempts residents must successfully complete before particular competency levels can be assumed.^[3-5] Another approach incorporates qualitative performance feedback, and given residents' different learning curves, this one is perhaps more defensible because supervisors decide to entrust a clinical or procedural responsibility to a resident deliberately and only after careful consideration—rather than automatically after a set amount of time. This crucial decision should be based on the trainee's phase of training, on a valid assessment of his or her competence for the specific task, and on patient acuity.^[6] However, a myriad of other factors also affect such decisions, and these are not well understood. To our knowledge, no valid instrument is available to robustly assess, given these varying factors, the level of independence that a trainee deserves.

Carrying out activities that are just at the edge of one's competence can stimulate maximum comprehension and a steep learning curve,^[7,8] but a paucity of studies support this phenomenon in clinical practice.^[9] An educational psychology term for doing something that is just beyond the learner's competence, or the gap between what the learner already can do and what he or she is about to learn to do, is "constructive friction." When supervisors entrust learners, including medical trainees, with only routine activities, learning is likely to be too slow or absent. Conversely, too much responsibility required at too early a stage may result in adverse effects for—in the case of medicine—both the patient and the trainee. Educational psychologists have labeled both of these situations "destructive friction."^[9-11]

Ten Cate^[12] introduced the concept of "entrustable professional activity" (EPA) to signify the professional tasks that medical trainees need to master during postgraduate training that require entrustment decisions by clinical supervisors. EPAs are useful units of analysis for establishing a competency-based curriculum. Ten Cate and Scheele^[13] used EPAs to define five levels of responsibility and proficiency (i.e., having limited knowledge, acting under close supervision, acting under supervision on call, acting independently, and supervising others). They postulated four groups of factors that may influence decisions regarding whether or when a trainee is ready to execute a critical activity independently (Figure 1). The first factor group focuses on the ability of the trainee. The second group, which can be especially hard to measure, includes factors relating to the personality of the supervisor. The third factor group encompasses the environment and circumstances (e.g., the time of day, facilities, and personnel present) in which the activities are executed. Finally, the fourth factor group entails the nature and complexity of the activity. The activity becomes more complex as several competencies are required in concert for successful and safe execution. Recently, a focus-group study conducted in a Dutch obstetrics–gynecology postgraduate training program confirmed the validity of these four factor groups.^[14] Three of these groups of factors (i.e., those pertaining to the trainee, the supervisor, and the clinical issue) align with a recent study of Kennedy and colleagues,^[15] which highlighted the drivers that encourage trainees to request clinical support. Clearly, none of these four factor groups act independently, but they do represent discrete and measurable constructs.

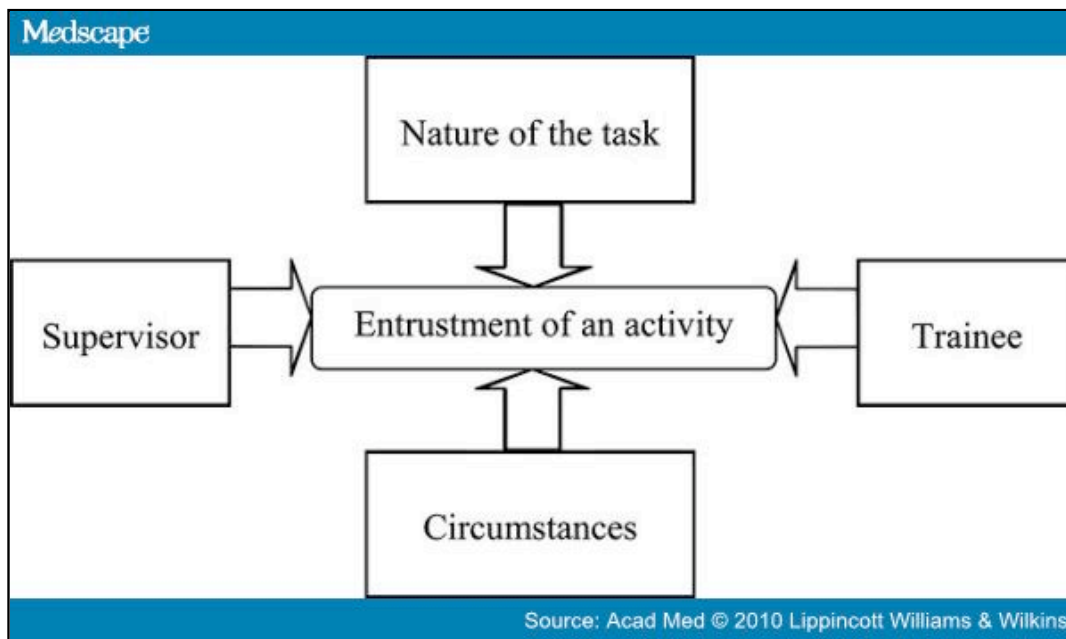


Figure 1. Factors that determine whether attendings entrust residents with critical patient-care activities within the clinical learning environment.

We interviewed trainers and trainees, exploring when, and under which constraints, attending anesthesiologists entrust critical activities to anesthesia residents. We chose anesthesiology because this specialty contains many tangible entrustment decisions. Anesthesiology postgraduate training in the Netherlands is currently transitioning to new standard requirements, which derive from the CanMEDS competency model and are comparable to the six Accreditation Council on Graduate Medical Education competencies.^[16]

Purpose

The aims of the study, an exploration of the dynamics of competency-based clinical training, were (1) to investigate whether clinical faculty members have a general conception about which EPAs they should entrust—and to what extent at each stage of the training—to residents, (2) to study whether the EPA framework is in accord not only with residents' feelings of self-efficacy for each EPA but also with the actual level of responsibility at which residents have been asked to work, and (3) to explore the human factors that determine whether a faculty member trusts a resident to perform a critical activity.

Method

Setting

We conducted the study between March and September 2008 at the Department of Anesthesiology of the University Medical Center (UMC) Utrecht, Utrecht, the Netherlands. The department offers a five-year postgraduate anesthesiology residency program in an academic hospital (four years) and community setting (one year). Residents, while on call, work in pairs of a junior (postgraduate year [PGY] 1–3) and a senior (PGY4 or 5) resident. At night and during weekends, senior residents directly supervise their less experienced colleagues. Both residents are supervised by an attending physician who is on call, but not necessarily on-site, and who may need as many as 25 minutes to arrive in the operating room. During weekday shifts (Monday through Friday 8 am until 11 pm) attending physicians are on-site.

Population

We invited all faculty anesthesiologists (n = 52) and residents (n = 56) at UMC Utrecht to participate in the study. We fully informed all the participants of both the purpose and procedures of the study during a general staff meeting. We recruited the clinicians through e-mail. We sent two reminder e-mails to nonresponders approximately two and three months, respectively, after the first invitation.

Instruments and Procedures

All respondents received an electronic questionnaire which was first piloted with several respondents and then refined. We gave each participant a code, and we removed all identifiers from the data before analysis. We compensated the respondents with a €15 (~\$22) gift certificate. We constructed two versions of the questionnaire: one for faculty members and one for residents.

For the questionnaires, we identified through a literature review, and selected through a consensus discussion, six critical EPAs that residents must master over the course of the anesthesiology residency. Residents regularly perform the six chosen EPAs during the required training program, and the American Board of Anesthesiology (ABA) lists all six as core competencies necessary for completing the ABA certification requirements.^[17] Three senior anesthesiology coauthors (C.K., P.B., and M.G.), all experienced in training residents, came to a consensus on the complexity of each EPA. They ranked the EPAs in order of increasing responsibility level from 1 to 6, taking into account both the complexity and the unique nature of the task, the training requirements residents needed to complete the task, and each task's potential to harm the patient. The six EPAs selected—(1) intubation of patient airway, (2) administering spinal anesthesia, (3) arterial line placement, (4) central venous line placement, (5) anesthetic management of an American Society of Anesthesiologists Classification 1 (ASA 1) patient, and (6) administering thoracic epidural anesthesia—demonstrate a sufficient amount of variance in required competence, and all receive substantial attention throughout the training program.

The questionnaire asked faculty members to identify which EPAs residents should master at what level of competency and at what year of postgraduate training. We defined mastery as "ready for unsupervised practice," as judged by the faculty respondents themselves. Because this was an exploratory study, we aimed to find out how faculty valued these levels, so we did not provide strict instructions beforehand. We asked the respondents to indicate a level of assumed proficiency for each of the six EPAs per PGY of training, using a 0 to 5 scale, based on the aforementioned five levels of proficiency from our previous work.^[13] 0 = the resident does not have relevant knowledge or skills to perform the EPA, 1 = the resident should have knowledge but is not competent, 2 = the resident should act only under direct, close supervision, 3 = the resident should act only under supervision on

call, 4 = the resident should be able to act independently, or 5 = the resident should be able to supervise others.

The residents' questionnaire required them to rate their self-efficacy for each EPA from 0 to 5, using a scale similar to that of the attendings. We also asked the residents, again using a similar 1 to 5 scale, to indicate the highest level at which they had performed the given activities in the last three months.

We invited a random sample of 10 supervising faculty members and 10 residents to participate in follow-up interviews. A secretary picked names in random order from an existing list. We personally informed all participants about the interview process and assured their confidentiality. We offered interviewees a €50 (\$75) gift certificate for completing the interview. A senior anesthetist from a different academic medical center who was not involved in the UMC Utrecht residency training or supervision (M.G.) conducted in-person interviews with faculty members. A young physician trainee, not involved in the anesthesiology training program (A.S.), conducted in-person interviews with the residents. The interviews were semistructured and lasted about 30 to 45 minutes. We gave the same guidance to both interviewers, and they both asked the same questions in the same order. We used two emergency night case vignettes as triggers to explore factors that influence entrustment decisions. In addition to the case vignettes, we presented to faculty members a list of all possible resident pairs, in each program year, and asked them to indicate, first, which of the two residents they would choose to perform a specific task and, second, what factors would make them trust one resident over the other. The interviewers (A.S. or M.G.) audio-recorded the 20 interviews, and A.S. transcribed them verbatim, removing all identifiers from the transcripts. The interviewers (M.G. and A.S.) also took extensive field notes during the interview process.

Data Analysis

The questionnaire data were analyzed with statistical software (SPSS Inc., Chicago, Illinois; version 15.0). We calculated frequencies, mean scores, and the discrepancy scores between faculty members' and residents' answers. We used qualitative data analysis software (MAXQDA, Berlin, Germany; version 2007) to analyze the interview transcripts. The analysis began by open coding, that is, sorting and labeling the data by content. We attempted to place the data into one of the four predefined categories described above (Figure 1). For example, after the interviewer presented a case vignette, one attending might say, "This patient is obese, has a beard ... there are a lot of risks involved. I would definitely come if a resident is young or not experienced enough in my eyes." We would assign this comment the main category code "Nature of the task" and the subcode "The risk of (severe) complication," plus the main code "Factor in the resident" and subcodes "resident's stage of training" and "resident's estimated experience." A.S. did all initial coding. Then, all of us further refined the categories (e.g., what to include in "circumstances") through discussions. After all the quotes were coded, we counted them. We used the frequency of comments and the fact that some interviewees clearly noted some reasons for trust as most important to create a rank order of importance within each of the four categories.

Ethical Considerations

We minimized the potential harm to residents and faculty by having a junior physician (A.S.), not employed in the hospital and not acquainted with the respondents, carry out the resident interviews. We employed a senior anesthesiologist (M.G.) not employed by the hospital, to carry out the faculty interviews. We ensured the confidentiality of the interviewees and stressed the voluntary nature of the interviews. The interviews started with an explanation of the purpose of the study, and no interviewees indicated that their risk of participating exceeded the benefits of this study. Because we invited all eligible residents and faculty to participate, equitability was not an issue. All transcribed interviews were coded before analysis and seen only by A.S., M.G., O.t.C., and a secretarial assistant. We coded all questionnaires before processing them. We sought informed consent at three moments: during a staff meeting, in a personal e-mail to each potential participant, and during an introductory explanation preceding the interview. We did not have participants sign an informed consent form because we allowed participants to opt out at any time.

Results

Characteristics of the Respondents

Of the 52 attending anesthetists involved in postgraduate training, 32 (62%) completed the questionnaire. Nineteen respondents (59%) were male, and 13 (41%) were female. The mean age of the attendings was 46 (range: 32–61; SD: 8.8). Half of the attending anesthetists practiced general anesthesiology, whereas the others worked in subspecialties: 4 (13%) worked in pediatric anesthesiology, 3 (9%) in pediatric cardiothoracic anesthesiology, 4 (13%) in adult cardiothoracic anesthesiology, and 1 (3%) in intensive care. Three attendings (9%) were fellows. We categorized faculty respondents into three groups based on years of practice and experience in postgraduate training with cutoff points at 5 and 15 years. Thirteen faculty members (41%) were junior

attending (<5 years of experience), 12 (37%) were intermediate (5–15 years of experience), and 7 (22%) were senior (>15 years).

Of the 56 residents, 31 (55%) completed the questionnaire. Of these, 12 (39%) were male, and 19 (61%) were female. The mean age of the residents was 31 years (range: 24–39; SD: 3.7). The study population consisted of 7 PGY1 residents (23%), 5 PGY2 residents (16%), 4 PGY3 residents (13%), 9 PGY4 residents (29%), and 6 PGY5 residents (19%).

All of the participants whom we initially approached for interviews agreed to participate. Of the faculty members who participated in an interview, 3 (30%) were junior, 5 (50%) intermediate, and 2 (20%) senior. Six out of 10 (60%) provided anesthesia for general surgery, 2 (20%) for adult cardiothoracic surgery, 1 (10%) for general pediatric surgery, and 1 (10%) for pediatric cardiothoracic surgery. Three (30%) of the residents interviewed were PGY1, 5 (50%) were PGY4, and 2 (20%) were PGY5. Half of the residents who were interviewed were junior, and the other half were senior residents. (The pediatric rotation in the fourth year concludes the junior stage of training, which explains why some PGY4 residents are still junior.)

We found no significant differences on any parameters between the participating attendings and residents and the total pool of attendings and residents, but there were slightly (nonsignificant) more female resident respondents and slightly (nonsignificant) fewer senior attending respondents.

Expected Levels of Proficiency at Subsequent Stages of Training

Figure 2 shows how the attendings' expectations of residents' proficiency differ throughout the residents' course of training. A large variation exists among faculty regarding the competencies expected in terms of both PGY and clinical EPAs. The differences among the six EPAs in degree of difficulty and risk ("intubation of patient airway" being the least difficult and risky, and "administration of thoracic epidural anesthesia" being the most difficult and risky) were confirmed by systematic differences found; for example, attendings consider residents ready to independently perform arterial line placement relatively early in their training but do not feel they are able to administer thoracic epidural anesthesia until much later. Most faculty members consider residents ready to execute the six target EPAs (except administering thoracic epidural anesthesia) independently from PGY3 and PGY4 onward; however, a few faculty never consider residents who are still in training ready to execute particular activities by themselves. But, as Figure 2 shows, at least one attending would consider PGY2 residents ready to independently execute five of the six EPAs.

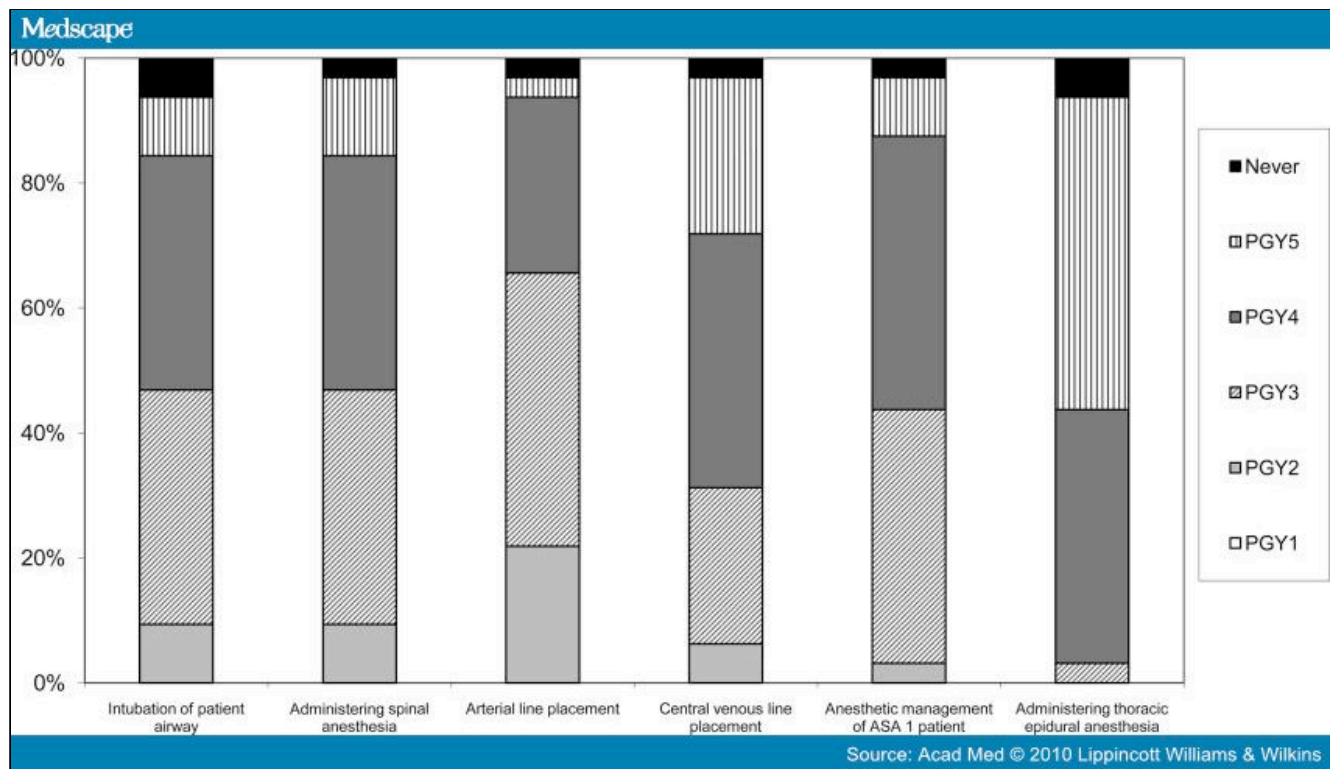


Figure 2. Percentages of attending anesthesiologists (n = 32) expecting residents to be ready for unsupervised practice by

postgraduate year and by entrustable professional activity (ASA 1 = American Society of Anesthesiologists Classification 1).

Discrepancy among Expectations, Perceived Abilities, and Actual Practice

Residents report performing EPAs at higher levels than faculty members expect, particularly in the early years of their training (Figure 3, Table 1). This potentially concerning discrepancy is most pronounced with central venous line placement and arterial line placement in PGY1. By the end of PGY5, there is general concordance between what residents are asked to do in practice and what the faculty expect them to be able to do, as indicated in the questionnaire; however, PGY5 residents actually perform some EPAs (i.e., administration of spinal anesthesia and administration of thoracic epidural anesthesia) at a lower level of responsibility than expected. In general, residents estimate their level of competence higher than the level at which attendings deem them competent to execute activities. In a few instances, residents feel they are instructed to perform an EPA above their level of competency (e.g., PGY1 residents managing an ASA 1 patient; Table 1).

Table 1. Staff and Residents' Indication of the Level of Responsibility by Year of Training (1–5) at Which Residents *Should Perform, Think They Can Perform, and Have Been Performing*

Entrustable professional activity	Postgraduate year	Faculty expectation		Residents' own perceived ability			Residents' self-reported 3-month highest level of task execution	
		Mean	Standard deviation (SD)	No. of residents	Mean	SD	Mean	SD
Intubation of patient airway	1	1.84	0.45	7	2.43	0.54	2.57	0.54
	2	2.75	0.62	5	3.80	1.10	3.40	1.14
	3	3.47	0.72	4	4.25	0.96	4.00	1.16
	4	4.25	0.72	9	4.78	0.44	4.78	0.44
	5	4.75	0.57	6	4.83	0.41	4.83	0.41
Administering spinal anesthesia	1	1.78	0.55	7	2.00	1.00	2.00	0.63
	2	2.81	0.59	5	3.40	1.11	3.20	0.84
	3	3.48	0.81	4	4.25	0.50	3.50	0.58
	4	4.22	0.71	9	4.78	0.44	4.33	0.82
	5	4.75	0.51	6	4.67	0.82	4.17	0.75
Arterial line placement	1	1.81	0.74	7	3.86	0.69	3.57	0.79
	2	2.97	0.78	5	4.60	0.55	3.80	1.10
	3	3.75	0.80	4	4.75	0.50	4.75	0.50
	4	4.53	0.62	9	4.89	0.33	4.78	0.44
	5	4.81	0.47	6	5.00	0.00	4.83	0.41
Central venous line placement	1	1.25	0.67	7	3.14	1.07	3.00	0.82
	2	2.31	0.64	5	4.00	1.00	3.40	0.55
	3	3.22	0.61	4	4.25	0.50	3.75	0.96
	4	4.16	0.77	9	4.67	0.50	4.56	0.53

	5	4.69	0.54	6	5.00	0.00	4.83	0.41
Anesthetic management of American Society of Anesthesiologists Classification 1 patient	1	1.72	0.52	7	2.29	1.11	2.83	0.75
	2	2.75	0.51	5	3.80	1.10	3.20	0.84
	3	3.35	0.80	4	4.00	0.82	3.50	0.58
	4	4.28	0.68	9	4.89	0.33	4.43	0.54
	5	4.78	0.49	6	4.83	0.41	5.00	0.00
Administering thoracic epidural anesthesia	1	0.84	0.45	7	1.57	0.79	1.67	0.52
	2	1.81	0.38	5	2.80	0.84	2.80	0.84
	3	2.52	0.63	4	3.75	0.50	3.50	0.58
	4	3.44	0.72	9	4.00	0.87	3.83	0.41
	5	4.47	0.62	6	4.67	0.82	4.17	0.41
Mean values across EPAs	1	1.54		7	2.55		2.61	
	2	2.57		5	3.73		3.30	
	3	3.30		4	4.21		3.83	
	4	4.15		9	4.67		4.45	
	5	4.71		6	4.83		4.64	

Table 1. Staff and Residents' Indication of the Level of Responsibility by Year of Training (1–5) at Which Residents *Should* Perform, *Think They Can* Perform, and *Have Been* Performing

Entrustable professional activity	Postgraduate year	Faculty expectation		Residents' own perceived ability			Residents' self-reported 3-month highest level of task execution	
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	4	4.25	0.72	9	4.78	0.44	4.78	0.44
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	3	3.22	0.61	4	4.25	0.50	3.75	0.96
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	3	3.35	0.80	4	4.00	0.82	3.50	0.58
	4	4.28	0.68	9	4.89	0.33	4.43	0.54
	5	4.78	0.49	6	4.83	0.41	5.00	0.00
Administering thoracic epidural anesthesia	1	0.84	0.45	7	1.57	0.79	1.67	0.52
	2	1.81	0.38	5	2.80	0.84	2.80	0.84
	3	2.52	0.63	4	3.75	0.50	3.50	0.58
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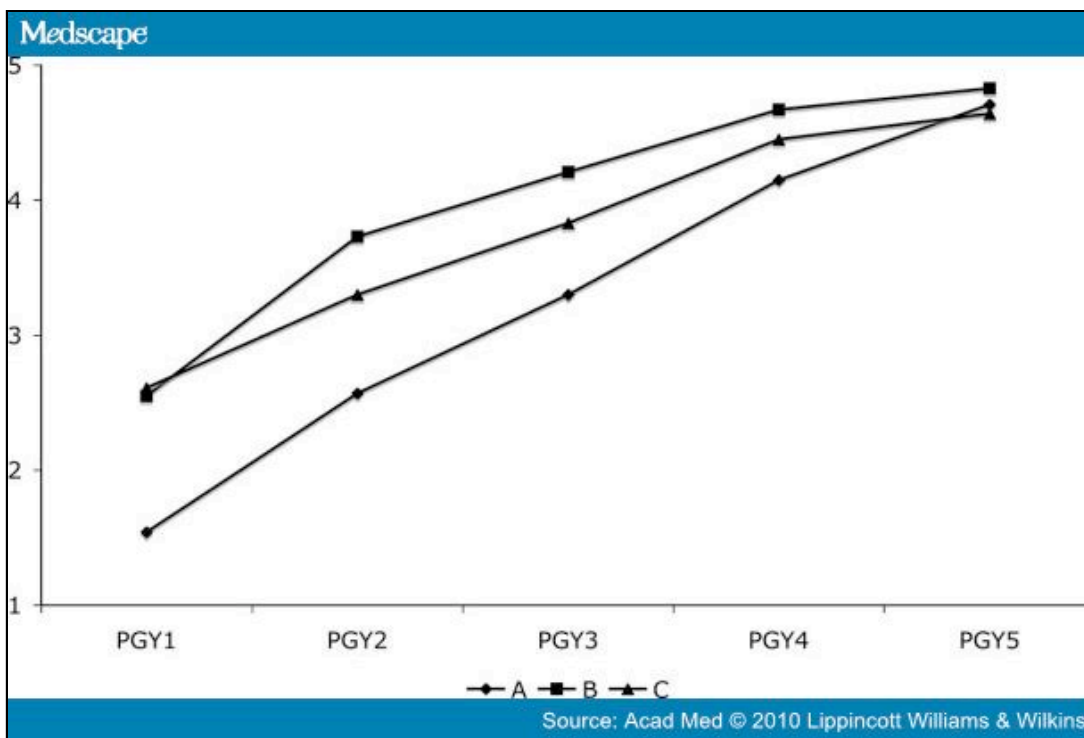


Figure 3. Mean proficiency levels: (A) How proficient attending anesthesiologists expect residents to be, (B) the level at which residents think they think they can perform, and (C) the level at which residents have actually been asked to perform.

Interview Results

Five themes emerged consistently throughout the interviews. One involved the relationship between, on one hand, the EPAs that residents actually performed and, on the other, the residents' and attendings' views of residents' ability to competently perform those EPAs. The other four themes aligned with the predefined groups of factors affecting entrustment (factors related to the resident, to the attending, to the clinical context, and to the task itself).

Working, Related to Supposed Level of Ability. Residents were comfortable with the training program's expectations. They did not think that executing activities with more supervision than they thought they needed hampered their learning, but they usually did not perceive performing above their expected level of competence as uncomfortable or unsafe either.

Yes, it happens sometimes that I receive supervision on activities I have done by myself many times before. Your supervisor is your trainer and assessor, so I understand. Also, they can give you pointers on how to improve your skills. (Resident, PGY1)

I think it is a good thing that supervisors watch you perform occasionally. You might think you are doing fine, and that you do not need any supervision any more, but that might just be the point where you start making mistakes. (Resident, PGY4)

Yes, sometimes I do perform activities on a higher level, but since there is always supervision around, these are opportunities for me to grow. (Resident, PGY4)

You learn to work independently, especially in the second year of training [done in community hospital]. When I do not feel competent, when I do not trust myself, I just tell my boss I need help. When you ask for supervision, you always receive it. (Resident PGY4)

Factors Affecting Entrustment. As mentioned, we were able to place all factors (that, according to our 20 interviewees, determine the amount of trust that supervisors have in their trainees) within the four groups we hypothesized were important. Table 2 gives an overview of the 30 factors that faculty and residents identified during the interviews.

Table 2. Factors That Determine Entrustment Decisions*

Factors	Factors mentioned by
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	Residents (n=10)	Faculty (n=10)	Total (n=20)
Factors in the trainee	10	10	20
Acquaintance with the resident	9	10	19
Stage of training	7	10	17
Plan or overview of the case	7	8	15
Communication skills	9	5	14
Estimated experience	6	8	14
Own request	9	4	13
Knowledge of limitations and when to call for help	6	6	12
Prior work experience	4	6	10
Apparent self-confidence	6	4	10
Working proficiency	1	9	10
General medical competence	3	6	9
Trustworthiness	2	7	9
Reliability	0	7	7
Medical knowledge	1	5	6
Adherence to tasks	1	3	4
Factors in the supervisor	10	9	19
General experience and specific experiences	10	5	15
Sense of medical responsibility	5	9	14
Prior patient experiences	9	2	11
Sense of urgency	4	7	11
Sense of educational responsibility	5	5	10
Subspecialty	0	3	3
Circumstances	10	7	17
Number of qualified personnel available	7	4	11
Physical distance of the supervisor to the patient	5	5	10
Legal issues involved	3	3	6
Presence of competing medical tasks	3	2	5
Time of the day	2	0	2
Conditions and equipment available	0	1	1
Nature of the task	9	10	19
Condition of the patient	9	9	18
Difficulty of the task	6	6	12
The risk of (severe) patient complications	5	4	9

* The numbers in bold indicate how many residents and how many faculty mentioned any Factors in the trainee, any Factors in the supervisor, any Circumstances, or any item related to the Nature of the task.

A. Factors in the Trainee. Both residents and faculty stated that the attendings' mere acquaintance with the trainee and his or her level of training were important for making decisions to trust residents with EPAs. In fact, attendings' acquaintance with the resident was mentioned in 19 of the 20 interviews. We calculated, on average, 3.55 comments regarding this factor per interview—more than for any other topic, except "working proficiency" (three interviewees repeatedly mentioned clinical skills as a core factor, but only one of the residents mentioned this, and then only twice). Knowing the resident does not necessarily mean that a faculty member will always trust him or her, and recent experiences with residents weigh heavily in faculty's entrustment decisions.

If I have worked several times with the same resident, I am better able to determine the level of competence of that resident and whether he is capable enough to execute activities. (Faculty, intermediate level)

I call my supervisor and tell him I think I can handle the case, but if he has never seen me work ... I think that makes it hard for him to determine whether or not he can trust me. (Resident, PGY1)

Faculty also consider the quality and comprehensiveness of the trainee's plan to be important. This consideration includes an estimation of the trainee's preparation and insight into potential patient complications that may occur in choosing one clinical plan over another plan.

When a resident consults me, I value the quality of his plan highly when making a decision in the amount of trust I give. Having little to add to his plan gives me confidence that he can handle the case. (Faculty, intermediate level)

I think it is important for my supervisors to hear me present the case in an orderly and complete way, which shows them I know what I am doing. (Resident, PGY4)

For faculty, competence is not entirely dependent on the year of training. Interviewees acknowledged learning curve differences among residents.

Residents' competencies can differ within their year of training, especially in the first year of training. When a resident has worked at an intensive care unit prior to starting residency training I tend to put more trust in him than if he would have started residency training straight after medical school. Also, some residents evolve faster while others need more time to master skills. (Faculty, intermediate level)

In general, faculty assume more independence in senior residents, as these residents are supposed to be ready to graduate soon and become certified specialists. For junior residents, attendings state that the clinical experience, such as managing acute care patients prior to residency, is important.

If a first-year resident has already worked at an ICU for two years, I will probably let him execute activities, such as arterial line access, more independently than a first-year resident who entered the program straight after medical school. (Faculty, intermediate level)

If residents state that they do not feel confident, they generally receive supervision, whether or not a faculty member trusts a resident to execute an activity.

When a resident asks me to assist him, I will, even if I do not think it is really necessary. (Faculty, senior level)

Sometimes, your supervisor will ask you if you want him to come; when you admit you do, there is never any discussion, he will come, no questions asked. (Resident, PGY4)

Attendings consider whether a resident is aware of his or her limitations to be very important.

This resident performs well, but I sometimes have trouble assessing what I can trust him to do. He does not seem to know when he needs to call for help. (Faculty, intermediate level)

I think it is important that my supervisor can trust that I will call before I get into trouble. (Resident, PGY4)

The supervisor's knowledge of the trainee's clinical skills and working manners is also important.

This resident is very skilled and knows what he is doing. (Faculty, senior level)

Clearly, supervisors' knowledge of the resident's competencies and attitudes weighs on their judgment. We have the impression that the mere lack of acquaintance leads to fewer independent responsibilities and more scrutiny and that, conversely, the mere fact that the supervisor knows the resident generally leads to more readily granted responsibilities.

B. Factors in the Supervisor. All residents mentioned that characteristics of the supervisor, such as their general experience and specific expertise, can affect entrustment decisions.

There are differences among supervisors; I think it has to do with their experience. For example, a more senior boss has more experience in assessing residents and will have fewer problems letting a resident perform certain tasks independently than would a junior supervisor. (Resident, PGY1)

I think a supervisor who has recently lost a patient in a similar case will just come, if only for his own confidence. (Resident, PGY4)

I made a deal with him: "You can watch or try once, and you have to tell me what you see." He failed to do both. I had poor judgment; it was misplaced trust on my side. That situation had its effect later on. A week later, he again was my junior resident, and thinking back, I believe I did not let him do as much as I would normally have allowed him to do. (Resident, PGY5)

Attendings stated that whether or not they actually oversee a procedure is not always balanced against trusting the resident, but it also depends on the responsibility they feel for both the patient and the residents they train.

You just have to be there for your resident, even though you know he can probably handle the case just fine. (Faculty, intermediate level)

As a supervisor, you are responsible for what goes on in your practice. (Faculty, intermediate level)

The amount of trust can be influenced by the attitude of the supervisors toward clinical training.

It is necessary for a resident's confidence to perform on his own sometimes. I usually peek through the OR window to make sure he is doing well, so I'm there without the resident realizing I am. (Faculty, senior level)

C. Circumstances. Attendings state that entrustment decisions also depend on the clinical environment, including the quality and availability of the team surrounding the resident.

It is also important whether or not my resident gets enough support from other team members. (Faculty, senior level)

It makes a difference whether the junior who is with me on call is in his first or in his third year; faculty members know that. (Resident, PGY5)

After 11 PM, an attending can take call either at home or in the hospital. Decisions on whether or not to entrust residents with clinical tasks are affected by the attendings' whereabouts.

It depends on where I am. In this particular situation, if I am at home I will come to the hospital. If I am already here, I would tell my resident to call me when he needs me. (Faculty, junior level)

I live too far away to go home when I am on call. And since I am already here ... it's easy to just be there and see how my resident is doing. (Faculty, junior level)

It makes a difference where my supervisor is. If he is at home, he will have to decide if he can trust me to perform on my own, whether or not it is necessary to postpone execution of activities for 15 minutes or so. If he is here already ... it's easier, he will be here whether it is really necessary or not. (Resident, PGY4)

Residents also stated that the time of day and mere convenience can each be a factor in the amount of trust that an attending places in them.

This may sound strange, but also the time of day.... It can make a difference when you call your supervisor at 11 pm, when he is still awake and alert, or in the middle of the night. When you wake him, I think sometimes he might be less eager to come. (Resident, PGY4)

It's contradictory sometimes. For example, during the day, you receive full supervision on a spinal needle placement on an ASA 2 patient who comes in for an ACL reconstruction, and in the middle of the night I find myself managing an ASA 3 patient without supervision. (Resident, PGY4)

D. Type of Activity. Both faculty and residents stated that the condition of the patient, the team, and discrete steps of the EPA are

important in entrusting decisions.

For such a complicated case I will just come, the risks are too high. (Faculty, intermediate level)

I think the most important [thing] for my boss is the case, how the patient is doing. (Resident, PGY4)

Discussion

We explored when and why attending anesthesia specialists decide to trust residents to execute critical patient-care tasks. Residents' and attendings' expectations differ with regard to what is expected from residents, what residents actually do, and what residents think they can do safely.

Attendings generally agree more on the levels of responsibility residents should have at the beginning and end of training than in their views about how much responsibility residents should have in the intervening years (PGY2–4). One surveyed faculty member would not fully entrust any resident with any EPA at any stage. It is tempting to speculate on the reasons for these differences among faculty, but any suggestions would need further analysis. Our impression is that overbearing attendings may lead residents to be more hesitant, resulting in attendings trusting residents less, whereas open and engaging attendings likely give the resident space to grow and think, resulting in greater trust. More in-depth studies are needed to substantiate this speculation.

Residents, especially trainees in PGY1, 2, and 3, estimate their own abilities higher than attendings consider justified. Interestingly, PGY1 residents reported that, in the last three months, they had been assigned responsibilities beyond the level that attendings on average indicate as justified for this stage. The residents themselves see few problems with this situation, as they also perceive their abilities to usually meet or exceed those necessary to perform these assignments. To determine whether residents overestimate their abilities or not is difficult. Successfully and independently executing a critical activity that exceeds one's expected ability, if no complications occur, may boost residents' self-efficacy.^[18] Self-confidence is needed to stimulate further development, and it may be natural, even educationally necessary, for trainees to overestimate their ability somewhat. However, the supervisor's judgment to limit independent execution of EPAs is critical if a trainee's overconfidence may compromise patient safety (e.g., when airway intubations take longer than they should, thoracic epidurals overshoot the epidural space, or central lines require several needle punctures).

We found substantial differences among surveyed attendings' views of which activities residents should be able to handle across varying stages of training. Factors related to individual residents, the clinical circumstances, or the nature of the EPA affect differences across EPAs, but factors related to the supervisor seem especially important for individual EPAs (Figure 2). This greater importance could reflect the supervisor's estimation of the difficulty or complexity of the EPAs and his or her estimation of the risk to patients.

Through the interviews, we identified 30 factors that influence entrustment decisions. All of these factors fit within the four categories we defined in an earlier study:^[13] factors related to the resident, supervisor, clinical circumstances, and patient-care task. Given the expected levels of proficiency at different stages of training, the multitude of factors involved helps explain the differences among the attendings' entrustment decisions.

The appropriate amount of trust attendings should place in a resident in a particular year of training cannot be determined in a generalized sense but must be individually customized to the trainee. In fact, supervisors must judge the interplay of factors related to the (1) resident, (2) the EPA, and (3) the clinical circumstances, including the facilities and the available clinical support of the microsystem.^[19,20] Table 2 may therefore serve as a first step in developing an entrustment decision support model and checklist. Sufficient acquaintance with the resident, the resident's stage of training, the availability of other personnel, the difficulty of the task, the risk of complications, and the condition of the patient all seem important. These factors may appear self-evident; however, they presently create much ambivalence and anxiety among faculty, and not understanding these factors and their interplay could potentially lead to much ambiguity and patient harm. For example, the finding that the quality of patient care is inadvertently compromised during the time of the year when more inexperienced residents are employed in hospitals allows hospital leaders to act on that information.^[21]

Table 2. Factors That Determine Entrustment Decisions*

Factors	Factors mentioned by		
	Residents (n=10)	Faculty (n=10)	Total (n=20)

Factors in the trainee	10	10	20
Acquaintance with the resident	9	10	19
Stage of training	7	10	17
Plan or overview of the case	7	8	15
Communication skills	9	5	14
Estimated experience	6	8	14
Own request	9	4	13
Knowledge of limitations and when to call for help	6	6	12
Prior work experience	4	6	10
Apparent self-confidence	6	4	10
Working proficiency	1	9	10
General medical competence	3	6	9
Trustworthiness	2	7	9
Reliability	0	7	7
Medical knowledge	1	5	6
Adherence to tasks	1	3	4
Factors in the supervisor	10	9	19
General experience and specific experiences	10	5	15
Sense of medical responsibility	5	9	14
Prior patient experiences	9	2	11
Sense of urgency	4	7	11
Sense of educational responsibility	5	5	10
Subspecialty	0	3	3
Circumstances	10	7	17
Number of qualified personnel available	7	4	11
Physical distance of the supervisor to the patient	5	5	10
Legal issues involved	3	3	6
Presence of competing medical tasks	3	2	5
Time of the day	2	0	2
Conditions and equipment available	0	1	1
Nature of the task	9	10	19
Condition of the patient	9	9	18
Difficulty of the task	6	6	12
The risk of (severe) patient complications	5	4	9

* The numbers in bold indicate how many residents and how many faculty mentioned any Factors in the trainee, any Factors in the supervisor, any Circumstances, or any item related to the Nature of

the task.

We suggest that these factors may be operationalized in a robust manner and give faculty the tools to make better decisions when faced with deciding whether to entrust residents with clinical activities.

We recognize several limitations to the study. We confined our study to a single Dutch anesthesia training program, and thus our findings need to be replicated in other clinical settings to determine external generalizability. Further, qualitative studies involving interviews bear an inherent risk of subjectivity because the interviewer can influence the nature of the interview, and other researchers may find different themes. To minimize these risks, we structured our interviews with a carefully scripted interview guide, and we identified relevant factors using factor analysis and theme saturation. We assessed only six EPAs, and assessing other clinical domains might yield additional factors, but these would most likely overlap with the factors we identified above.

To our knowledge, this is the first time a study has assessed the opinions of individual faculty and trainees on entrustment decisions. Dijksterhuis and colleagues^[14] conducted a related, focus-group study among obstetrics–gynecology faculty and trainees, but our study yields factors on a more detailed, generalizable, and actionable level. Dijksterhuis and colleagues make a conceptual distinction between levels of competence and degrees of independence, whereas we consider the level of competence a measure of the trainee. In another study of internists and emergency medicine physicians, Kennedy and colleagues^[15] used a similar methodology but from a different angle. Their questions was not, "When do supervisors entrust responsibility?" but, rather, "When do trainees ask for help?" They found that factors in the resident, factors in the supervisor, and the nature of the clinical question (i.e., those related to the EPA) determine the requests. Requesting help from an attending and deciding to trust a resident are intimately related, and we feel the Kennedy and colleagues' study supports our findings. In another recent qualitative study, Ginsburg and colleagues^[22] interviewed 19 experienced internal medicine attendings on qualities of outstanding, average, and problematic residents. They came up with eight clusters of factors, based on a grounded theory approach, that are similar to our findings (Table 2, "Factors in the trainee"), but they also uncovered additional resident qualities, such as work ethic, leadership skills, and impact on staff. These factors do not overlap with ours but, rather, seem to supplement them. This indicates that further studies will be helpful to complete the picture of factors that affect decisions to entrust critical care to trainees.

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Finally, we hope this study will help to improve postgraduate training. The study's findings fit into the competency-based postgraduate training models that have emerged in recent years.^[2,13,20,23–25] Construct assessments that address both trainee competence and patient safety are necessary. Current methods of assessing clinical competence, which use duration of training as a major criterion, may not be sufficient. Assessments should include both measuring the amount of trust attendings place in residents and understanding why they do so. Understanding entrustment decisions and including them in assessing and promoting trainees will lead to physicians who are competent, safe, and *trustworthy*.^[6,24]

Future studies might include a more in-depth analysis of the mechanisms that determine supervisors' decisions to entrust residents with patient-care tasks. These studies might aim to validly measure these decisions or to understand whether and how entrustment decisions can play an important part in assessing trainees. If entrustment decisions can be better validated, they may lead to more formalized statements of awarded responsibility that could be included as milestones in a trainee's competency portfolio.^[13,26] Such an advance could accelerate the development of a competency-based training program. These programs support patient and provider educational outcomes, and they are more influenced by the quality of care and the providers' actions than the mere educational content or duration of the training program.

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Ethical approval

This study was exempt from ethical approval by the ethical review board of the University Medical Center Utrecht, Utrecht, the Netherlands (See also "Method / Ethical considerations," above).

Conflicts of interest

None.

Previous presentations

Some of the results of this study were orally presented at the 2009 meeting of the Association for Medical Education in Europe (Malaga, Spain) and the 2009 Annual Meeting of the American Society of Anesthesiologists (New Orleans, Louisiana).

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