

BECOMING A PHYSICIAN

Graded Autonomy in Medical Education — Managing Things That Go Bump in the Night

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Traditionally, physician training has followed the apprenticeship model: students, residents, and clinical fellows participate in delivering medical services to patients under the supervision of accredited professionals. This hierarchical system offers trainees graded responsibility, enabling them to learn their trade by performing increasingly complex functions over time and experiencing gradual reductions in supervision. Whether by design or not, the middle of the night has historically been the time when trainees were able — and indeed required — to practice more independently. For many physicians, the need to make decisions on their own at night, knowing they could call for help if necessary, has been the crucible of their maturation as clinicians.

This model of graded autonomy and long periods of continuous responsibility was called into question by the death of Libby Zion in a New York emergency department in 1984. Measures undertaken first by New York State 2 years after the 1987 publication of the Bell Commission report, and later by the Accreditation Council for Graduate Medical Education (ACGME) in 2003 and again in 2011, were intended primarily to improve patient safety by reducing medical errors (see timeline). Although the Bell Commission cited resident fatigue as less important than inadequate supervision in

the Zion case, the first changes focused on restricting work hours, perhaps because those changes seemed easier to operationalize than altering supervision and reporting structures. In the decade since duty-hour reforms were implemented nationwide, evidence has shown that residents tend to get a modestly increased amount of sleep, but patient care is not safer, nor have outcomes improved.^{1,2}

Now, policy changes are being implemented to address supervision: residents are increasingly required to discuss newly admitted patients with their attending physicians at night, and roughly one third of U.S. teaching hospitals have increased supervision even more in intensive care units (ICUs), adopting staffing models involving nighttime intensivists. However, evidence showing the value of increased supervision and the resulting inherent loss of autonomy in resident decision making is similarly absent. Indeed, the recent Study to Understand Nighttime Staffing Effectiveness in a Tertiary Care ICU (SUNSET-ICU), which one of us conducted with colleagues, showed that a traditional model of nighttime ICU staffing (autonomous in-house residents with telephone access to fellows and attendings) produced the same outcomes as a model involving in-house critical care attendings supervising residents at night.³

Together, these studies suggest that newer resident-training ap-

proaches entailing reduced work hours and curtailed autonomy may not achieve the goal of improving the safety of patients today. An open but equally important question is how training models offering reduced opportunities for autonomous decision making affect the quality of care for future patients.

We believe that the professionals and institutions responsible for training physicians must understand the effects of changes in supervision on educational value and on future quality of care and resource requirements. To elucidate those effects before residents' autonomy is irreparably restricted, the ACGME and others who regulate training programs should allow and indeed promote evaluations of various models of graded autonomy, especially at night, rather than setting one rigid standard on the basis of conjecture alone.

Two key transitions occur when physicians become independent practitioners. First, and most obviously, they are expected to function as competent clinicians, able to make decisions and perform procedures without supervision. To promote this goal, new terminology has been developed for use in evaluating trainees' "core competencies," changing the goals of the curriculum from imparting and testing residents on a specific knowledge base to promoting expertise in the functions and attributes expected of future physicians.

1970s	1980s	1990s	2000s	2010s
	1984 Libby Zion Dies ↓	1987 Bell Commission Report ↓	2003 ACGME Work-Hour Rules ↓	2011 Revision of ACGME Rules ↓
TRENDS IN TRAINING				
Primary care internal medicine programs established	Increased training of general internists	Hospitalist training programs established	Increased training of hospitalists	Increased training in patient safety, quality improvement, and systems
ATTENDING-PHYSICIAN QUALIFICATIONS				
Clinical and laboratory-based subspecialists	Subspecialists and general internists	General internists, subspecialists, and a few hospitalists	General internists, hospitalists, and subspecialists	Hospitalists, general internists, and fewer subspecialists
ATTENDING-PHYSICIAN SUPERVISORY ROLES				
Rounds only in the morning, briefly on old patients, teaching on new admissions	Same as 1970s	Same as 1970s	Rounds in the morning, on new patients, closer supervision of all patient care, some in-house attendings in ICUs overnight	Attendings present on the ward most of the day, some in-house overnight attending in both ICUs and wards
DEGREE OF RESIDENT AUTONOMY				
Residents spoke with attendings only in morning rounds, almost never called at night	Same as 1970s	Increased contact during the day	Informal protocols for calling attendings; increased contact during the day and night	Explicit protocols for calling attendings at night (e.g., must call for change in code status, high-acuity admission)
RESIDENT WORK HOURS				
On call 1 night in 3; post-call stay until at least 5 p.m.	Same as 1970s	On call 1 night in 4; post-call stay until at least 5 p.m. (except in New York)	Maximum, 30-hr shifts and 80 work hr per wk	First-year residents limited to 16-hr shifts, other residents to 28-hr shifts; all residents limited to 80 work hr per wk
1970s	1980s	1990s	2000s	2010s

Timeline for Changes in Graded Autonomy in Internal Medicine Residency Programs, 1970s–2010s.

ACGME denotes Accreditation Council for Graduate Medical Education.

Attending physicians must now evaluate “educational milestones,” or trainees’ attainment of proficiency in core competencies defined by accreditation bodies. Other new terms, including “entrustable professional activities” and “statements of awarded responsibility” reflect the aim of translating theory into practice. The ACGME’s “Next Accredita-

tion System” will use the concepts underlying this new language to regulate residency programs.⁴

A second, subtler challenge for physicians who begin their independent careers in teaching hospitals is the expectation that they will simultaneously provide trainees with appropriate supervision and autonomy. Experienced teaching physicians are currently

encountering this challenge, given the shifting roles of trainees and attendings (see timeline). Should attendings routinely review laboratory values and imaging reports? Should they impose minor changes in therapies (e.g., medication doses or intravenous infusion rates) ordered by residents?

We believe that most residents chafe at such close supervision.

Studies in the United States and Canada have shown that many residents believe their autonomy is unduly compromised just by having an intensivist physically present to provide high-level oversight of the nighttime care of the most critically ill patients.^{3,5} Although enhanced supervision doesn't always mean reduced perceived autonomy, when or where the pros will outweigh the cons is unknown. Therefore, accreditors and regulators should allow

ports that have been trained under various autonomy models.

To enable more rapid innovation, shorter-term studies should also be undertaken to compare the effects of various training models on intermediate outcomes that may lie in the putative causal pathway toward clinical competence. Such outcomes may include the accuracy of residents' initial diagnoses as compared with those ultimately reached by attendings; physicians' evalua-

tivity cost of using the attending-physician workforce to augment resident supervision rather than providing more services to other patients. The effects of increased supervisory activities on attendings' quality of life and risk of burnout also merit study.

The changes sparked by the Libby Zion case were based on the sensible assumption that it's unsafe to require that overly tired junior physicians make decisions independently for acutely ill patients. Thirty years after Zion's death, mounting evidence suggests that attempts to make residents less tired have not helped patients. Yet now we are poised to enter a new era of training in which programs may curtail previously cherished educational opportunities for residents to independently solve difficult patient problems after dark — to learn how to manage the things that go bump in the night. Just as the evidence from the SUNSET-ICU trial⁵ led the Hospital of the University of Pennsylvania to abandon its plan for 24-hour, in-house coverage by attendings in its medical ICU, future studies of resident-training models may yield actionable knowledge. But that can happen only if accreditation bodies and training programs avoid making the same mistake in diminishing residents' autonomy as they appear to have made with work-hour restrictions — imposing inflexible changes that limit opportunities for evaluating the effects of those changes on patients.

To elucidate the effects of changes in supervision on educational value and on future quality of care and resource requirements, the ACGME should allow and indeed promote evaluations of various models of graded autonomy.

and encourage experiments in which various supervision strategies are developed and compared in order to determine the most effective levels of supervision.

Studies comparing risk-adjusted outcomes of future patients whose care is managed by physicians who were granted different amounts of autonomy during training would provide the highest-quality evidence to guide development of the best future training approaches. Although the time required to produce this kind of evidence is a barrier, a decade has elapsed since the 2003 duty-hour changes without the reporting of any such assessments. If we are to avoid being in the position of regretting yet another lost opportunity 10 years from now, we need to initiate studies comparing physician co-

tions of the likelihood that residents will become the types of doctors we'd want to care for us and our loved ones; and the number of independent, consequential decisions made by physicians during residency — for instance, choices to order pulse steroids or thrombolysis in internal medicine, decisions to end a resuscitative effort in emergency medicine, and decisions regarding whether or when to operate on a patient with suspected acute appendicitis.

Finally, the cost of increased supervision needs to be measured and compared with its effect on patient safety, to determine whether changes such as providing in-house nighttime attendings are the most efficient ways to improve outcomes. Such analyses should also consider the oppor-

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