The Changing Paradigm in Residency and Fellowship Training: Embracing the Future

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Rhode Island Hospital (RIH) has a long and storied history of training physicians. The first intern (then called a house physician and surgeon) began training just three years after the end of the Civil War in 1868.[1] In the 132 years since then, thousands of physicians and surgeons have received postgraduate residency and fellowship training there. Among the graduates of RIH training programs were William P. Murphy, MD, a 1920 intern who received the Nobel Prize in Medicine and Physiology in 1934 with two other researchers for his work on pernicious anemia, as well as William McDonald, Jr, MD, an intern from 1899 through 2001 who served as FDR's neurologist after he was diagnosed with polio. During World War II, Rhode Island Hospital nurses and physicians—including residents—staffed the U.S. Army's 48th Evacuation Hospital, serving in the China-Burma-India theatre, with a mobile hospital that cared for as many as 1900 patients at a time.

Postgraduate medical education has evolved dramatically in the past century. True "residents" once lived in the hospital, didn't marry, and worked around the clock on many different specialties. Now, rotating internships are completed in medical school, when specialty choices are made, and residency consists of structured, discipline-specific experiences in increasingly complex care environments, ruled by goals, objectives, and duty hours regulations. Residents now expect to have a "normal" life as well, as many are older, married, and have children. Residency and fellowship programs and the institutions that sponsor them are under increasingly stringent rules for how trainees work, how they learn, and how they document what they do. Even for those of us who have trained in the past 20 years, the changes are dramatic. The days of "see one, do one, teach one" and the apprenticeship model of learning are history, unlikely to be revived, and have been replaced with competency-based training, as detailed later in this issue by Dr. Martha Mainiero.

In order to standardize training, the ACGME (Accreditation Council for Graduate Medical Education) was established in 1981 as an independent accrediting organization for allopathic postgraduate residency training. The ACGME, with its specialty-specific Review Committees, sets standards and rules for programs and institutions, providing the basis for board certification and licensure in most states. For osteopathic physicians, similar accreditation standards are set by the American Osteopathic Association.

The issue of duty hours burst onto the national consciousness in 1984, when 18 year-old Libby Zion died in an emergency room in New York.[2] While not definitively proven to be the result of negligence on the part of the housestaff caring for her, her father (a former federal prosecutor and reporter) shined the political and media spotlight on the risks associated with being cared for by overworked housestaff with indirect attending supervision. The Bell Commission recommended and New York State subsequently established the 80-hour work week limit and a requirement for in house supervision in 1989.

In 2003, the ACGME adopted the current requirements for "duty hours" for all residents and fellows.[3] Those rules (Table 1) include an 80-hour per week work limit (averaged over four weeks), one day off in seven without clinical or educational responsibilities (averaged over four weeks), and ten hours off after being on call in house and after "daily duty periods." The Common Program Requirements in effect currently state that supervision should be "appropriate" without specifying what that means. With the introduction of national standards for work hours for residency, residency education changed. Schedules became much more complicated in order to insure compliance. Didactic sessions were rescheduled, even recorded and/or made web-based, in order to insure that the post-call resident who needed to go home after being in the hospital for 24 or more hours would continue to have the educational experience of other residents. As rules about "service versus education" were implemented, midlevel providers were hired and additional hospital staff and resources were utilized to insure that residency programs were compliant with ACGME rules in order to maintain accreditation. This occurred in the setting of the Balanced Budget Act of 1997, which limited funding to hospitals for graduate medical education, freezing resident numbers which persist today. For instance, at Rhode Island Hospital and the Miriam Hospital, residency positions are "capped" at approximately 350, where they were in 1996. Hospitals and faculty groups have funded the additional 200 "over the cap" positions added since that time.

The impact of the 2003 duty hours rules on resident quality of life has been positive. The impact on education, clinical experience and patient safety is inconclusive and has not been systematically evaluated across specialties. Overall resident work hours have decreased[4] while work hours for attending physicians in many specialties have increased.[5] Several studies have noted that residents are not sleeping longer hours despite having the 2003 duty hours rules designed to increase sleep and diminish fatigue.[6, 7] The impact of the 2003 changes on educational outcomes, including Board certification, written examination scores, and scholarly productivity, has raised concerns in some specialties[8, 9] but has not been systematically studied across all residencies. Data on the impact of the duty hours changes on patient safety are mixed. While increased technical errors have been noted in sleep-deprived residents on simulation exercises such as laparoscopic surgery trainers[10] and it has been suggested that medical errors are more frequent in sleep-deprived interns working in the ICU,[11] other studies have found no difference in acute care surgery outcomes or increase in postoperative complications in residents operating after 16 to 24 hours on call.[12, 13] Patient safety has not been adequately studied in the post-2003 era to form conclusions about the impact of the 2003 changes on the quality and safety of medical care in teaching hospitals.[14]

In 2008, Congress empowered the **Institute of Medicine (IOM)** to revisit the 2003 duty hours rules and determine whether additional restrictions were needed to improve patient safety. The IOM report, published in December 2008, recommended that duty hours remain limited to 80 hours per week, averaged over four weeks, but that residents working more than 16 hours be given five hours of protected sleep between 10 pm and 8 am before returning to work (Table 1).[15] It was estimated that some of the major changes would cost $1.7 billion (in 2008 dollars) to put into effect nationwide, largely for hiring additional 8,000 residents, as well as attending physicians, midlevel providers, lab technicians and other hospital staff.[15]

Reaction from housestaff, program directors, GME directors, and specialty organizations to the IOM report was brisk. While residents often applauded the further restriction of duty hours, concerns were raised by all groups (housestaff included) about how the mandatory sleep hours could be enforced and how the recommendations would impact medical education and attaining competencies in a field of medicine without prolonging training. The Affordable Care Act did not include provisions for increases in cap positions in most teaching hospitals.

In response to the IOM report—and in accordance with the plan to revisit the 2003 Common Program Requirements after five years of implementation—the ACGME formed a Task Force including program directors, residents and GME leadership. Three different academic groups conducted outside reviews of the literature on the effect of the 2003 duty hours rules.[16-18] In reviewing 203 publications evaluating 83 different outcomes, the authors noted a "critical gap in the literature in the dearth of studies that investigate the net tradeoffs between such key outcomes as patient safety, resident safety, resident education, resource costs (to society and programs) and quality of life for resident and attending physicians."[16] After review of the literature, expert testimony, development of recommendations and a period of public comment, the ACGME released the new Common Program Requirements in September 2010, which will go into effect in July 2011.[19] These new rules, under which all ACGME-accredited programs must soon operate, include significant changes in both supervision as well as duty hours (Table 1).

For the nearly 800 residents and fellows in Rhode Island, and for their faculty, significant changes will begin this July. The PGY-1s (or interns) will be allowed to work 16 hours a day, and must have immediately available supervision in house. They must leave after 16 hours of work, without additional time to attend didactic sessions, to complete a surgical case, or to sign out patients. More senior residents and fellows cannot perform clinical duties or attend clinic or didactic sessions after 24 hours of continuous duty. A trainee wishing to "remain beyond their scheduled period of duty to continue to provide care to a single patient" can do so if all other patients are signed out and the reason to remain on duty is justified (defined as "required conti-

	2003 ACGME Standards (3) In effect since July 2003	**2008 IOM Recommendations (15)**	**2010 ACGME Standards (19)** To go into effect July 2011
Maximum Hours Per Week	80 hours/week averaged over 4 weeks	No change	No change
Maximum Hours Per Day	24 hours + additional 6 hours for transitions of care, clinic, didactics No new patients can be accepted after 24 hours	16 hours for all residents with no protected sleep period 30 hours allowed if there is a 5-hour protected sleep period between 10pm & 8am	16 hours for PGY-1s PGY-2 and above: 24 hours + 4 hours to finish work and transition care (no clinic, no didactics, no new patients) Strategic napping is strongly suggested
Minimum Time Off Between Scheduled Shifts	10 hours	10 hours after day shift 12 hours after night shift 14 hours after a 30-hour period (including sleep period); these residents cannot return to work until 6 am the following day	Should have10 hours and must have 8 hours 14 hours after 24 hours of in-house duty for PGY-2 and above
Maximum On Call Frequency (In House)	Every 3rd night averaged over 4 weeks	Every 3rd night with no averaging	Every 3rd night averaged over 4 weeks for PGY-2 and above PGY-1 residents cannot take 24-hour overnight call
Days Off	4 days/month: 1 day (24 hours) off in 7, averaged over 4 weeks	5 days/month: 1 day (24 hours) off in 7 + one 48-hr period off per month	1 day (24 hours) off in 7, averaged over 4 weeks
Maximum Number of Consecutive Night Float Shifts	Not addressed	4 nights 48 hrs off after 3 or 4 nights of consecutive duty	6 nights
At Home Call	Time spent in the hospital counts toward the 80-hour work week limit. At-home call must not be so frequent or taxing as to preclude rest or reasonable personal time for each resident	Not addressed	Time spent in the hospital counts toward the 80-hour work week limit. At-home call must not be so frequent or taxing as to preclude rest or reasonable personal time for each resident
Moonlighting	Internal moonlighting is counted toward the 80 hour work week limit	Internal and external moonlighting count toward the 80 hours and all other duty hour limits (including the 10 hours between day shifts)	Internal and external moonlighting must be included in the 80 hours
Supervision	Must be adequate	Adequate, direct, onsite. PGY1s should not be on duty without immediate access to a supervisory physician in house	PGY1s must have supervision on site and immediately available (i.e., supervising physician resident or attending must be in the hospital)

Table 1. Current (2003) ACGME Duty Hours Standards, 2008 Institute of Medicine (IOM) Recommendations, and recently approved (2010) ACGME duty hours standards to go into effect on July 1, 2011. PGY = postgraduate year; ACGME = Accreditation Council for Graduate Medical Education.

nuity for a severely ill or unstable patient, academic importance of the events transpiring, or humanistic attention to the needs of a patient or family."[19] The resident will have to document the specific reason for staying late "in every circumstance" and submit this to the program director, who will be responsible for tracking individual and program-wide "episodes of additional duty."[19]

This will force most training programs in which in-house call occurs to move to a "night float" system in which teaching patients are cared for by a day team and a night team (each working 12-14 hours) in order to ensure compliance with all duty hours and adequate time for sign out. Moving to night float on all rotations—including those in the ICUs—will result in more transitions of care ("handoffs") and the potential for additional errors. The ACGME has mandated that programs and institutions "monitor effective, structured hand-over processes to facilitate both continuity of care and patient safety" and that we "ensure that residents are competent in communicating with team members in the hand-over process."[19] It has been estimated that the ACGME changes will cost between $226 million and $694 million to implement.[20]

On a local level, without additional increases in federal support for postgraduate training, hospitals will be faced with difficult financial decisions in an environment of increasing uncompensated care and down economic times. To maintain safe patient care and come into compliance with the new rules, midlevel practitioners, additional attending physicians and in some cases additional residents will need to be recruited at hospital expense in institutions operating above their resident cap numbers.

In this issue of Medicine/Health Rhode Island, residents and residency program directors discuss the changes that have occurred in graduate medical education in the last decade and anticipate the impact of the ACGME's new duty hours rules coming into effect in July 2011. The impact of the new rules on education, patient safety, and housestaff and faculty well-being will have to be carefully studied and transparently reported in order to assure the public that physicians—and the institutions that train them—take patient and resident safety seriously. The impact of the changes on adverse events, continuity of care, length of inpatient stay, mortality, national patient safety goals, patient education and adherence, and patient satisfaction needs to be addressed prospectively, as well as educational outcomes, case numbers (in procedural specialties), competency, and the quality of training of residents and fellows under the new system. The responsibilities and documentation requirements of program directors and GME directors will continue to increase in order to maintain accreditation for programs and institutions. The evolution in residency and fellowship training continues, and is dramatically different from that experienced by Drs. Murphy and McDonald so many years ago in Rhode Island.

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