Resident Duty Hours: Enhancing Sleep, Supervision, and Safety

The principal aim of medical residency in the United States is to prepare recent medical school graduates to practice medicine independently. A fundamental requirement of resident education is in-depth, firsthand experience caring for patients. During the three to seven years of this training, residents often work long hours with limited time off to catch up on their sleep. They can experience fatigue on the job, which research shows is an unsafe condition that contributes to increased errors and accidents. However, many medical educators believe extensive duty hours are essential to provide residents with the rich and varied educational experiences necessary to become competent in the complexities of diagnosing and treating patients.

At the request of Congress in 2007, the Institute of Medicine (IOM) charged the Committee on Optimizing Graduate Medical Trainee (Resident) Hours and Work Schedules to Improve Patient Safety to evaluate current evidence on the topic and to develop strategies to optimize work schedules and other activities, such as the transfer of patient care at the end of a shift. The committee’s goal was to recommend ways to improve conditions for safety during training while maintaining the necessary educational experience to ensure long-term patient safety after trainees are on their own. In 2003, the Accreditation Council for Graduate Medical Education (ACGME) set a national standard restricting resident workweeks to a maximum but not required 80 hours per week (averaged over four weeks) and limiting the longest consecutive period of work to 30 hours. Based on its review, the committee finds considerable scientific evidence that 30 hours of continuous time awake, as is permitted and common in current resident work schedules, can result in fatigue, and that adjustments to the 2003 rules are needed. But it is also necessary to look beyond hours of work alone as a risk factor during training and to put into place practices, including time for sufficient sleep, enhanced supervision, appropriate workload, and clear and effective handovers of patient care, that will minimize the risk of error in the training environment.

PREVENTING AND MITIGATING FATIGUE

Because our healthcare system relies upon residents to provide 24-hour coverage in teaching hospitals, these doctors-in-training typically do not have very much time off during their residencies to obtain the amount of sleep necessary to maintain peak performance. The following factors increase fatigue:

- Prolonged wakefulness, defined as more than 16 continuous hours
- Reduced or disturbed periods of sleep
- Shift variability (for example, working at night)
- Volume and intensity of work
The science on sleep and human performance is clear that fatigue makes error more likely to occur. Thus, the committee determined that any adjustments to duty hours should focus on ensuring regular opportunities for sleep to prevent acute and chronic sleep deprivation and to minimize opportunities for fatigue-related errors, rather than focus on simply reducing total duty hours.

Additionally, because no single model of scheduling fits all training facilities or medical specialties, the committee offers two options for extended shifts and maintains the choice of working up to an 80-hour averaged workweek. The committee’s recommended adjustments to duty hour limits, which are outlined and compared to current ACGME rules in Table 1, include:

- Duty hours should not exceed 16 hours per shift unless an uninterrupted five-hour break for sleep is provided within shifts that last up to 30 hours.
- Residency programs should have variable off-duty periods between shifts based on the timing and duration of shifts to increase residents’ opportunities for sleep each day, as well as regular days off that enable residents to recover from chronic sleep deprivation.
- Medical moonlighting, defined as additional paid healthcare work, by residents should be restricted.

A lack of adherence to current limits on duty hours is common and underreported. Therefore, the committee recommends changes to ACGME monitoring practices, including unannounced visits and strengthened whistle-blower processes to encourage resident reporting of violations of limits and undue pressure to work too long.

OPTIMIZING RESIDENT EDUCATION AND TRAINING

Since the 2003 duty hour regulations were implemented, many residents have been burdened with increased workload pressure because they need to care for as many patients as before in less time. The committee recommends ensuring a patient workload appropriate to learning and reducing the amount of non-educational work for residents, as well as improving supervision of residents with more frequent consultations between residents and their supervisors. These steps will maximize the educational value of tasks assigned for each resident while creating a manageable workload that also allows compliance with duty hours. There are more than 26 types of residency specialties, and each has a different mix of patient characteristics, flow of work, and types of interventions. The committee recommends that Residency Review Committees (RRCs) set specialty specific guidelines for the number of patients residents should be permitted to treat during a shift, based on the level of residents’ competency and patient characteristics. The committee found that closer supervision leads to fewer errors, lower patient mortality, and improved quality of care. Particularly, first-year residents should not be on duty without immediate access to an in-house supervisor. These recommendations are designed to ensure that we better train today’s residents so they can better treat tomorrow’s patients.

IMPROVING PATIENT SAFETY AND ERROR DETECTION

The committee makes recommendations to enhance the culture of safety at medical training institutions. Among them is a recommendation designed to improve handovers, the transfer of patient responsibility and information from one healthcare practitioner to another. Because patient handovers often provide opportunities for er-
rors to occur, frequently due to a lack of clear communication between clinicians, the committee recommends that shift changeovers be scheduled to ensure adequate overlap time to conduct effective handovers. Handovers increased after the 2003 change in duty hours, and they may increase further depending on how programs choose to schedule staff for patient care.

While learning new tasks, people can make errors (for example, forgetting to order a diagnostic test); the key objective in residency is to establish conditions to prevent harm from reaching patients. It is also important to turn errors or “near-miss” events into learning experiences to prevent future occurrences. Residents should be taught error detection, correction, reporting, and monitoring so they can participate fully in the hospital’s quality improvement efforts.

**ADDITIONAL RESOURCES FOR IMPLEMENTATION**

For institutions to implement all of the committee’s recommendations, additional funds and staff will be needed, although some recommendations could be implemented immediately. The committee estimates the cost of hiring staff substitutes such as support staff, other clinicians, or additional residents, for current residents’ excess time could be approximately $1.7 billion. Nearly one-quarter of the $1.7 billion relates to bringing residency programs into compliance with the 2003 limits. The committee also recommends monitoring and evaluation of the implementation of all the proposed changes to assess the impact, detect any unintended consequences, and provide information to guide future fine-tuning of duty hours.

**CONCLUSION**

Residency programs are an essential and practical element of physician training in our country. Residents provide essential care at a lower hourly cost than other clinicians, all the while gaining an impressive education through on-the-job training. The nation must take a hard look at its residency programs—including hours, schedules, supervision, patient caseloads and handovers—and ensure that they serve both patient and resident safety today and educational needs for tomorrow. Altering the hours of resident work alone is not sufficient to maximize safety and learning. Until these changes take place, residency programs are not providing what the next generation of doctors or their patients deserve.
FOR MORE INFORMATION . . .

Copies of Resident Duty Hours: Enhancing Sleep, Supervision, and Safety are available from the National Academies Press, 500 Fifth Street, N.W., Lockbox 285, Washington, DC 20055; (800) 624-6242 or (202) 334-3313 (in the Washington metropolitan area); Internet, www.nap.edu. The full text of this report is available at www.nap.edu.

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