



# **Beyond Duty Hour Reform: Redefining the Learning Environment**

## **APDIM Learning Environment Task Force**

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## Introduction

The educational mission is superimposed on a complex, underfunded healthcare delivery system that was designed to deliver patient care and not medical education. Broadly defined, the learning environment includes inpatient and outpatient clinical activities, didactic activities, and research experiences. Residents serve dual roles as trainees, learning the art and practice of medicine as well as serving an important patient care function for hospitals. Because residents can work long hours for mediocre pay, they have become a vital part of the workforce for hospitals.

The systems of care at any given hospital will in large part determine the quality of the learning environment. As financial pressures mount for hospitals with residents, the learning environment is at great risk and thus so is the education of its residents. The implementation of the duty hour regulations, known first as Section 405 for the state of New York, and then subsequently as the Accreditation Council on Graduation Medical Education (ACGME) duty hour reform, have had a dramatic effect on the learning environment. Interestingly, the Bell Commission report issued in 1987 had two major recommendations: specific limits on residents' work hours and stricter rules regarding resident supervision. With respect to that latter, it was recommended that an experienced supervising physician must be in the hospital at all times or, in certain cases, no more than 30 minutes away from the hospital. The major focus of the public and state agencies has been on duty hours and not resident supervision.

Many believe that resident level tasks and responsibilities have not changed despite the need to work fewer hours thus creating work compression for residents that leads to greater fatigue and burnout. In order to control resident duty hours, the learning environment must be carefully examined with respect to overall work load, clerical tasks, and resident supervision.

The learning environment has not been well studied. In the post-Bell Commission era, a meta-analysis of 16 studies, including over 1,000 residents in six specialties revealed the residents spend 36% of their effort in direct patient care, 15% in organized teaching activities, and 35% in activities with little or no educational value (1). They concluded that the educational content of resident work must be considered in addition to hours worked when considering residency reform. Post ACGME duty hour reform, a cross-sectional survey of chief medical residents outside of New York examined the effects of work hour reform in internal medicine clinical experiences and didactic education. The results were disappointing, as 72% of programs reported no change in average daily census per intern, 48% redistributed admissions throughout the call cycle, 36% of programs increased inpatient responsibilities, 34% of programs increased float time and decreased elective time, and 56% of programs reported decreased conference attendance (2). This latter study suggests that the service needs of the hospital took precedence over the resident education.

Although every learning environment is different, it is clear that an inverse relationship exists between resident workload and education. If the learning environment is thought

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about in these terms, then a paradigm begins to emerge that considers factors that increase resident work thereby decreasing time available for education, and factors that decrease resident work and increase time available for education. There are many factors that increase resident work, including the number of hours worked per week; the number of continuous duty hours; the number of nights or transitions from night to day; the number of admissions; the acuity of the patient population; the turnover of patients; the amount of non-physician work including transporting of patients, IV services, phlebotomy, making follow-up appointments, completing paperwork, etc. Those factors that decrease work and provide more time for education include the percentage of patients geographically grouped; existence of a reliable, user friendly computerized physician order entry system and electronic health record; the quality and availability of transport, phlebotomy, IV services, clerical support, and consultants; non-teaching services to manage surges in patient volume; and standardized sign-out protocols.

As this paradigm is considered, the concept of a resident work formula begins to emerge. This formula recognizes the factors above in different learning environments, often even occurring in the same program, and adjusts the work load accordingly. In a sense, the more efficient the learning environment, the more patients residents can care for. This paradigm suggests that reforming hours is not enough. The entire learning environment must be redesigned. Simply limiting hours without redesign creates work compression that might be more dangerous than unlimited hours alone. An ideal learning environment would eliminate non-physician tasks, promote efficiency, provide adequate supervision, and promote basic sleep hygiene.

In 2006, the Association of Program Directors in Internal Medicine (APDIM) charged the APDIM Learning Environment Task Force to review the issues related to the learning environment and identify principles for change. Several principles were identified including decreasing work intensity, enhancing time at the bedside, improving conference attendance, promoting daily reflection, reducing errors, increasing efficiency, and improving transitions of care. In carefully considering these principles, the task force developed 11 recommendations approved by the APDIM Council on March 17, 2009.

### **Recommendation 1**

Admission and census caps for any given service must be based on a resident work formula. A cap of 10 patients per intern is acceptable if the following conditions could be met: the patients are geographically concentrated, the interns are supervised by senior residents, and the acuity score is less than the 75th percentile. Lower caps can be justified on an annual basis and might be different for different services in the same program. Particular consideration should be given to services with high turnover or when there are large cross cover responsibilities.

Although the task force was only examining the learning environment in internal medicine, it felt that such concepts should be extended to all specialties and that workload limits for individual resident census, number of patients that could be cross-

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covered by a single resident, and number of admissions should be established in every discipline.

### Recommendation 2

Residents must not be required to schedule routine tests and procedures for inpatient and outpatients, nor should they be required to schedule patient appointments.

One study involving the use of a medical team assistant to restructure intern tasks did a time motion analysis of interns during the weekday over a three-month period (3). It revealed that interns spent an average of 187 minutes a day on the phone. The following non physician tasks were identified and subsequently assigned to the medical team assistant: calling physician offices, obtaining outside records, arranging inpatient diagnostic procedures, coordinating care with social work and care coordination, and arranging for discharge follow-up visits. The team without the medical team assistant spent 91 minutes a day on the phone with 15 of those minutes spent calling doctors' offices and 25 minutes spent calling social workers. The team with the medical team assistant spent only two minutes a day calling doctors' offices and 16 minutes calling social workers.

An additional unpublished study used an inpatient appointment service to decrease intern phone time. A total of 268 discharges were examined from a busy general medicine service over a three-month period. Those discharges needed 396 follow-up appointments, an average of 1.5 appointments per discharge. Sixty-two percent had appointments scheduled prior to discharge and 38% self scheduled post discharge. The average amount of time it took for an intern to schedule a post discharge appointment was 26 minutes. A three month trial was set up to compare the impact of an internal referral service with usual practice to schedule post discharge appointments. The study revealed no duty hour violations in the group of interns using the referral service versus 12 violations in the control group. Notably, there were no significant differences in the rate of outpatient appointment cancellations and no-shows, readmission rates and emergency department visits post discharge, length of stay, or discharge time of day.

An additional study reviewed the use of health technicians to limit nonclinical activities of surgical interns. During a two-week period, daily data cards were collected from three interns and eight health technicians at a veterans affairs hospital on hours spent in work or clinics and conferences.

Interns with access to health technicians worked four and two hours less each weekday and weekend day respectively and increased their time in the operating room by 6.5 hours per week. Health technicians performed an average of 20.25 tasks per day.

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### **Recommendation 3**

Shorter periods of continuous duty have created more handoffs. Unpublished data from a university-based program revealed that patients with an average length of stay of five days had an average of 15 signouts per intern with each intern averaging 300 sign-outs per month. The entire institution had 4000 sign-outs daily or 1.5 million sign-outs per year. Several studies suggest that handoffs are a vulnerable period for patients. An analysis of adverse events in 3,146 medical admissions at Harvard Medical School Brigham and Women's Hospital showed that of 124 adverse events, 44% were preventable, and an OR=3.5 that an adverse event occurred during cross coverage (4). A university-based study of 26 interns caring for 82 patients revealed 25 critical incidents due to failed communication during sign-out (5).

Programs must train residents in how to conduct safe, efficient, and effective handoffs. Programs must have a standardized sign-out process that at a minimum includes a standard template for sign-out and face to face handoffs. The quality of the sign-out should be assessed at regular intervals by supervising physicians. Consideration should be given to computerized sign-outs that integrate with medications and electronic notes.

### **Recommendation 4**

Residents are subject to numerous distractions most notably from their pagers. Such distractions are very inefficient and can compromise patient safety. Programs must have a paging policy that specifies the parameters for paging. Programs must work with the nursing staff to educate them about the impact of distractions on patient care. Consideration should be given to having two-way communication devices to promote safe and efficient patient care.

### **Recommendation 5**

Another vulnerable aspect of patient care is the transition from one level of care to another. Programs must have a transition of care policy that specifies the type of communication required when a patient moves from one level of care to another.

### **Recommendation 6**

Programs should have clinical decision support systems available for patient care. This may include, but is not limited to, computerized physician-order entry, order sets, or clinical practice guidelines.

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### **Recommendation 7**

Sleep hygiene should be incorporated into the duty hour language of the program requirements. Specifically, fatigue management strategies such as napping should be included for programs using extended duty periods. An unpublished trial at a university-based hospital in 2002 compared two groups of interns: those receiving a four-hour uninterrupted nap on call versus interns on a traditional 24 + 6 schedule with no nap. The group that napped slept a median of 3.2 hours per on call period and a mean of 36-50 hours per week. Those on the traditional schedule slept 2.0 hours per on call period and a mean of 30-42 hours per week.

### **Recommendation 8**

Formal sleep education must be included in each year of training, which would include the effects of fatigue and fatigue management.

### **Recommendation 9**

For rotations that require night shifts, shifts should be grouped so they occur consecutively to enable acclimation to night work. Night shifts should also move forward in time to respect natural circadian rhythms. Programs must not regularly require single night shifts spread out in time.

### **Recommendation 10**

Since the best fatigue management strategy is sleep, programs should have a transportation plan in place as well as space for prophylactic napping for individuals completing shifts longer than 16 continuous hours.

### **Recommendation 11**

Programs should have at least three months per year with overnight duty periods limited to no more than two per month to ensure adequate time for recovery sleep.

### **Conclusion**

It is time for the learning environment to be redesigned. The goal of patient care should be to provide a reliable system of care that is redundant enough to limit medical errors but flexible enough to provide autonomy that promotes independent learning. The

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patient care team must be redefined such that each team member has specific tasks appropriate for their skill set. Team training should occur regularly. Work load limits need to be set for individual residents and teams that recognize individual variation among services with respect to volume, acuity, geographic consolidation, and turn over. The new learning environment should limit non-physician tasks and must be adequately supervised. The new learning environment cannot exist in a vacuum and must adopt best practices from other high fidelity industries that incorporate sleep science as a fundamental principle. High quality research must be conducted in this area to test the feasibility of such best practices in a healthcare environment. ACGME should provide institutions and programs with flexibility in duty hour regulations (excluding the 80-hour rule) to conduct such research. Further reductions in duty hours are unlikely to improve patient safety—the primary goal of the regulations. It is only through redesign of the systems of care that define the learning environment that we will create a safer, more reliable health care delivery system.

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### References

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