Junior Doctors and Mistakes: A Healthcare System Perfectly Designed for Mistakes by Interns and Residents

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All health professionals make mistakes. However, interns and residents are particularly vulnerable to mistakes because of their role in service delivery, their relative inexperience and an archaic training model. Hospitals rely heavily on residents to provide medical services, often at the expense of their training and education. Intense work schedules exclude most residents from participating in hospital-wide efforts to improve care. Moreover, time pressures and constantly changing work routines prevent junior doctors from accessing hospital information networks that disseminate organizational and clinical information. This raises the question of how junior doctors can participate in quality and safety discussions if they are not part of the communication network.¹,²

If we are to reduce the number of patients harmed in hospitals, we need to standardize ward activities such as hand-overs and out-of-department consultations.³⁻⁸ Additionally, it is imperative that we recognize that medical education will need to include competencies of knowledge, skills and behaviors that relate to the management of complex environments. Lastly, interns and residents need to change the way they manage and think about errors. They need to understand why errors occur and how they can be prevented. In the event that an error occurs, these junior doctors must know how it should be managed.

For more than a century the apprentice-ship model has endured in health care, but conflicting demands from multiple stakeholders raise questions about the viability of this model. First, the short-term needs of teaching hospitals often dictate the mix and make-up of the medical workforce. Second, the training needs of the interns

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and residents are often secondary to the need of the teaching hospitals to provide services. Third, most junior doctors do not work in a community setting. The specific concerns identified with junior medical officer training include: multiple stakeholders; lack of an accountability framework for medical training; lack of objective measures for training posts; lack of reporting of educational outcomes; undervaluation of training roles by hospitals; inadequate selection and recruitment procedures; training confined to the public system; absence of clear links between training posts; service needs and workforce planning; inflexible work practices and inadequate training for un-streamed residents.

While there is growing research on under-use, overuse and misuse of health care involving medical specialties, little research has focused on the experience of interns and residents. Of the 152 references about overuse, under-use and misuse cited in Crossing the Quality Chasm, none cover the experience of junior doctors. While experienced clinicians were included, no research specifically examining the clinical context of mistakes by junior doctors was incorporated. Nevertheless, there is sufficient evidence to illustrate that interns and residents comprise a large group that is vulnerable to error. The impact of fatigue on resident performance, hours of work, lack of preparedness for practice, emotional responses to mistakes and quality of supervision provide sufficient evidence supporting a major overhaul of their working environment.

One of the first articles to connect patient safety with junior doctors was a 1973 publication by Bates, who documented doctors’ fears of mistakes in the context of preparedness for hospital practice. Mizrahi’s 1984 study examined the experience of medical mistakes by junior doctors and found that house staff made serious and fatal mistakes during their internship; half of the 22 new interns interviewed were involved in serious patient errors in their first two months.

A study by Lesar et al. of critical incidents involving prescribing errors in a teaching hospital found a rate of 3.13 errors for every 1000 orders written, of which 1.81 errors were significant. The greatest error rate (4.01 per 1000 orders) occurred between 12:00PM and 3:59PM with first year post-graduate residents having a higher error rate (4.25 per 1000 orders) than other prescribing classes. Prescribing and dosage errors were also identified by Wu et al. as a significant category of mistakes in their survey of 254 internal medicine house officers. While causes of errors were chosen from three factors, experience, job overload and case complexity, there was no discussion of why there were too many tasks or any of the organizational problems we now associate with overwork or fatigue. House officers in this study discussed the mistake with their supervisor in 54 percent of cases, and the patient or family was involved in discussions in only 24 percent of cases. As with Mizrahi’s study, Wu’s study shows that mistakes were mainly viewed as a personal responsibility requiring personal solutions. In an editorial in the British Medical Journal nearly a decade later, Wu held the blame culture within medicine culpable for this guarded approach to medical error. This calls to attention the need for interns and residents to be further involved with discussions about medical error, as well as the need to encourage a less guarded ap-
A study by McKee and Black in 1992 examined whether any evidence existed to show that improved working conditions improved the quality of patient care. The authors found that if physicians slept less than eight hours it resulted in a drop in the performance of tasks that required concentration. The authors qualified this by acknowledging that environmental stimuli and variation in individual susceptibility can mediate the effects of lack of sleep or fatigue. Their literature review found no variation in mistake rates between doctors’ working standard and extended hours. However, the evidence did show that sleep deprivation causes doctors to treat patients with less care and sensitivity. This is of particular concern given the long hours demanded of residents and interns.

Baldwin et al. studied the nature, frequency and cause of mistakes as part of a 10-year study of a cohort of junior doctors in the United Kingdom. They found that during 1993-96, 77 percent of doctors reported making one or more significant mistakes during the previous month. The main causes of moderate and major mistakes identified by the doctors were ignorance and inexperience. This did not reduce over time even with less serious and moderate mistakes being recorded. The authors surmised that doctors’ increasing knowledge was outpaced by their increasing autonomy, and hence provided a greater opportunity to make mistakes. They based this on the decrease in frequency in the number of times doctors consulted others. This study highlights the need for the establishment of better communication channels and the need for interns and residents to actively participate in these channels.

A study by McLauchlan, Jones and Guly compared the diagnostic results of junior doctors with senior doctors in a study that investigated how well each group was able to diagnose significant X-ray abnormalities after trauma. They found that only 32 percent of junior doctors made a correct diagnosis. Of the senior doctors, 80 percent made a correct diagnosis.

Pearson’s study of the factors influencing inexperienced doctors in prescribing found that many of the traditional forums for information exchange such as morning hand-over of patients and grand rounds failed to provide appropriate field experience in prescribing. Their study of 20 interns identified a variety of positive and negative influences on prescribing practices. Registrars had a positive influence on interns prescribing while consultants were negatively perceived as being authoritarian, inflexible and unavailable and likely to “tend to stick to their old ways.”

All the interns acknowledged their prescribing errors detected by senior medical staff. Interns described two responses to prescribing errors from their superiors. The first involved the mistake being communicated to the intern in a non-confrontational manner, offering clear explanations of why a prescribing decision was flawed and guidance to the appropriate course of action. The second response was described by interns as being equivalent to “personal nightmares,” involving confrontational communications between the intern and the clinician without the latter providing clear guidelines for better prescribing. Other negative learning factors included time pressures, as well as staff and hospital hierarchies. The study concluded the influences on prescribing...
practices are multifactorial and are not just driven by the pharmacological properties of a drug.\textsuperscript{22}

The traditional apprenticeship model for training junior doctors is straining under pressures from healthcare technology, patient expectations and demands for greater efficiency.\textsuperscript{23} Despite significant changes in hospital organization and management, the method for training and educating interns and residents has changed little. Unfortunately, one of the things that has changed is the lack of a one-on-one relationship that characterized the older apprenticeship model. The apprenticeship model that exists today requires a resident to work with many consultants and interact with multiple clinicians on a daily basis.\textsuperscript{24} Residents today are expected to understand the unwritten rules of each consultant from whom they take instructions and to ensure that appropriate orders are followed for each consultant’s patients.\textsuperscript{25} The use of multiple consultants often leads to fragmented supervision, less instructions and inferior performances.\textsuperscript{24} This, coupled with the lack of standardization of roles and duties, makes junior doctors more vulnerable to errors.\textsuperscript{26}

Residents are low in the medical hierarchy and are dependent upon senior clinicians who have the power to influence their upward mobility. Earning the confidence of a supervisor becomes paramount, since progression depends on favorable reports based on informal and formal feedback, as well as subjective and objective assessments about competence and commitment. From the perspective of a resident this may necessitate engaging in unsafe practice such as performing procedures without training or working long hours when fatigued. Studies show that while stress and fatigue negatively impact performance and consequently patient care, there is little recognition of these two in the workplace.\textsuperscript{27-30}

Clinical experience is central to doctors’ education. Biographical accounts by interns and residents of their early medical years are uniformly disparaging about medical training.\textsuperscript{31-36} They invariably remark about isolation, overwork and negligible guidance from senior clinicians. Outcomes of care may be unknown to them because patients continually move around or because of rostering issues.

Thirty years ago Fraser identified three principal functions of internship.\textsuperscript{37} The first was the establishment of the link between the dependence of students and the autonomy of practicing clinicians. The second was the provision of opportunities to independently practice skills and knowledge. The final function was the facilitation of apprenticeships. Roghmann et al. narrowed the function of internship to one solely relating to the acquisition of technical skills in handling disease.\textsuperscript{38} Yong and Collie were less prescriptive about the intern year, observing that it was a period of training in general clinical method and patient responsibility.\textsuperscript{39}

Many studies have identified the need for training and education of interns and residents.\textsuperscript{40-46} However, in addition to the consolidation of clinical skills, other skills such as teaching, communication, collaborating with nurses and allied health workers, working with families, showing compassion, dealing with confidentiality issues, using common sense, interviewing and being the patient’s advocate have been identified as necessary qualities for well-rounded physicians.\textsuperscript{42,43,45} Unfortunately, opportunities for education and training...
are diminishing with shorter hospital stays and medico-legal demands that require students and junior doctors to provide the same level of care as an experienced practicing professional.\textsuperscript{47} Programs providing continuing medical education vary in design, scope and opportunity. The demands on junior doctors in their service provision role conflicts with their educational needs. Regrettably, only a few studies directly deal with this tension.\textsuperscript{48-51} One of these studies found that the identification of a sub-set of patients managed by nurses or physician assistants permitted the number of patients per resident to be reduced, thus allowing more time for both residents and teachers for educational activities.\textsuperscript{51} Additional areas for improved learning in the wards have been identified by interns and residents: time commitment by clinical teachers, interactions between senior clinicians and residents, bedside teaching with active involvement of the residents, as well as observation and critical feedback.\textsuperscript{50,55}

## Supervision

Unsupervised interns and residents are vulnerable to medical mistakes.\textsuperscript{18,20,25,56-58} Supervision of trainees has long been a core component of the apprenticeship model.\textsuperscript{70} Yet unlike other health related professions, such as nursing, social work or psychology, there is little written about clinical supervision in formal literature. The supervision process involves a professionally qualified person helping the novice to gain insights into their professional practice, knowledge and skills. But anecdotal evidence from junior doctors and the literature suggest that junior doctors are often unsupervised when they treat patients. The reasons for inadequate supervision are varied and relate to many factors including organizational and administrative factors, service demands, reluctance of junior doctors to ask for help and the unavailability of supervisors at the time. Irrespective of the reasons, poor quality of supervision is a constant theme in surveys of junior doctors.\textsuperscript{12,61-63}

Answering the question of who provides supervision to interns and residents is difficult, since few studies explore the topic. While anecdotally, junior doctors report that registrars provide them support and guidance, results of a national survey of the chief residents and directors of all U.S. residency programs in general pediatrics showed that residents in their second and third years of training were cited as most responsible for supervision and teaching of neonatal resuscitation in the delivery room.\textsuperscript{64}

Studies link diagnostic errors to poor supervision and show that errors by junior staff are minimized when they receive specific training and are tested on their abilities before working unsupervised.\textsuperscript{20,65-67} Supervision is more than case discussion and co-signing medical records. It often requires (depending on the site) direct patient interview and examination by the attending physician.\textsuperscript{68,69}

A survey of Norwegian pre-registration interns found that 50 percent of the medical and 65 percent of the surgical house officers reported receiving no introductory information or supervision before commencing hospital duties.\textsuperscript{70} Two-thirds said they did not attend any educational program and 80 percent reported that they did not receive systematic feedback on their work. Most house officers received no evaluation of their work at the end of
the pre-vocational year.\textsuperscript{70} In addition to inadequate feedback on performance, pre-registration house officers also perceive a lack of support from senior staff.\textsuperscript{71,72,74}

Data on the ward activities of junior medical staff are minimal, but one survey of interns and residents examining estimates of time spent in various activities showed that interns and residents underestimated the time spent in supervision with the attending physicians.\textsuperscript{75} The mean estimated proportion was 7.7 percent whereas the mean actual proportion was 16.9 percent.\textsuperscript{75} Despite this discrepancy, there is evidence that when residents are directly supervised by attending physicians significantly higher rates of compliance with guidelines are shown than for residents acting alone.\textsuperscript{76}

This is particularly problematic with respect to skills acquisition. Many interns learned procedures while unsupervised and were judged by supervisors to have poor technique and inadequate mastery of procedures.\textsuperscript{77-79} When a junior house officer’s judgment is combined with a senior house officer’s assessment and compared to that of an attending physician, the house officers were found to be significantly less reliable than the attending physicians.\textsuperscript{80} This becomes particularly relevant when the supervising doctor is a resident or senior house officer.

### Fatigue

Attention to the hours of work initially commenced with campaigns on “safe hours” for junior doctors, but it is now recognized that trainees and senior clinicians are also affected.\textsuperscript{81-83} There is strong scientific evidence linking fatigue and a drop in performance.\textsuperscript{84-87} A study involving 13 interns working 12-hour consecutive shifts in an emergency department showed a significant reduction in visual memory capacity across the night shift.\textsuperscript{87} Increased fatigue, decreased alertness and impaired performance in a variety of psychomotor settings have been associated with poor quality sleep and inadequate recovery.\textsuperscript{86,88,93}

### Work Environment and Organization

Hospitals are complex organizations comprising many autonomous units and departments, each having a different culture and modus operandi.\textsuperscript{94-96} Since junior doctors are rotated through different departments and hospitals, familiarity with the environment becomes an issue. A report published by the British Medical Association identified the working environment along with long hours as major contributors to stress experienced by doctors.\textsuperscript{97} It is well-known that such changing environments afford many opportunities for errors and this coupled with the inexperience of junior medical officers, further contributes to medical errors.\textsuperscript{56,82,98-103}

The influential report Crossing the Quality Chasm\textsuperscript{95} identified organizational factors for urgent reform because the way work is organized is a recognized feature in system failures.\textsuperscript{59,104,105} Firth-Cozens observed that not only do individuals experience stress but “whole organizations” can be stressed as well.\textsuperscript{28} The level of care offered in hospitals, the availability of specialized services and the access to senior staff also impacts the quality of care offered to patients. In addition, work satisfaction that
derives from an organized and predictable work place is a known factor impacting performance.28,106,107

Communication

Clinicians and managers recognize that good communication is a major component of quality health care and that poor communication is often a component of substandard care and treatment of patients. But communicating prompt and accurate information to and from the multiple health workers, including consultants, registrars, nurses, pharmacists, radiologists, medical records and laboratory personnel, is not easy, nor are there standard ways for communicating throughout hospitals. The success of junior doctors in treating their patients often depends on the informal communications between staff and their understanding of the workplace.108 Medical mistakes caused by miscommunication, nonexistent or inadequate communication are well-known and occur daily in hospitals.109-111 The ability of clinicians to communicate with patients and other health professionals often determines treatment outcomes.112,118,119,124 Methods such as using checklists, protocols and “care-pathways” have been identified as being effective methods for communicating patient care orders.125 Inadequate communication between physicians’ patients and their families has emerged as an important determinant of malpractice lawsuits.114,126

Conclusion

There is a growing amount of literature on the importance of reporting adverse events.127 However, the literature devoted specifically to the difficulties that doctors have in reporting adverse events focuses mainly on reforming medical education and changing the medical culture.16,30,126,128,130,131,132 The blame culture in medicine affects interns and residents in terms of how they manage and learn from medical errors, including whether or not they discuss them with more senior colleagues.15,104,133,134 Unlike nurses, medical clinicians do not routinely report medical errors.13,134,136 Existing methods that provide doctors with a forum for discussing mistakes, such as mortality and morbidity conferences, peer review and grand rounds, are often conducted in a “blame” environment.15,48,139,140 Self-reporting methods have been suggested for improving reporting, including using the “morning report,” to enhance detection of adverse events and encourage self reporting of mistakes.141,142

The link between knowledge, inexperience and medical errors is accepted within medicine as one of the consequences of employing doctors that are still undergoing training. As the community demands greater accountability and transparency of the health system the qualifications and experience of junior doctors will be subject to increased scrutiny. A reduction of mistakes by junior doctors involves their understanding and learning from their own mistakes as well as those of others.

The first two or three years in the life of an intern or resident should not be seen as a rite of passage nor should long hours be viewed as badges of honor. Instead, they should be looked at as examples of unsafe practice. We need to change the system to one of support – one that educates within a patient-centered service. Understanding factors involved in mistakes by interns and
residents will help to better understand how the work environment and medical culture impact safe practice. A more open and just culture for interns and residents can only be achieved by a commitment to patient safety, restructured workplaces and enhanced training.

References
