Training for Efficiency: Work, Time, and Systems-Based Practice in Medical Residency

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Abstract

Medical residency is a period of intense socialization with a heavy workload. Previous sociological studies have identified efficiency as a practical skill necessary for success. However, many contextual features of the training environment have undergone dramatic change since these studies were conducted. What are the consequences of these changes for the socialization of residents to time management and the development of a professional identity? Based on observations of and interviews with internal medicine residents at three training programs, we find that efficiency is both a social norm and strategy that residents employ to manage a workload for which the demand for work exceeds the supply of time available to accomplish it. We found that residents struggle to be efficient in the face of seemingly intractable "systems" problems. Residents work around these problems, and in doing so develop a tolerance for organizational vulnerabilities.

Keywords

efficiency, physician socialization, residency training, time, work

The experience of medical education is arduous. During the years of formal training following medical school, young physicians, known as "residents," are primarily responsible for delivering care to patients in teaching hospitals. Both mass media presentations and the scholarly literature have identified residency as an exhausting experience (Mizrahi 1986; Shem 1978). Sociologists, interested in residency as socialization for a professional occupation, have explored the way residents cope with this experience and how that coping shapes professional identity (Bosk 1979; Bucher and Stelling 1977; Light 1980). One aspect of residents' shop floor culture described, but not typically the focal point of analysis, is efficiency.

BACKGROUND

Efficiency and Time Management: Then

When efficiency is discussed in the literature on resident socialization, it is typically conceptualized in one of two ways. The first focuses on how trainees present information to peers, consultants, and senior physicians at rounds (Anspach 1988; Arluke 1980). Residents are socialized to be as efficient as possible in presenting a case—"a history should contain only those points deemed to be important, with a minimum of wasted words" (Anspach 1988:362). This is also a theme in the literature on socialization in medical school. Students face an overwhelming amount of material to learn and must come to terms with incomplete mastery of medical knowledge (Fox 1957). They prioritize the knowledge that attending faculty need to hear in order to make treatment decisions and learn to present only that information and nothing more (Becker et al. 1961; Mumford 1970). Efficiency is

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an individual skill of self-presentation that trainees master to communicate effectively and signal competence.

Second, efficiency is conceptualized as a response to the stresses and strains of the residency experience. Residents attempt to control time both to retaliate against the brutal nature of their training and to maintain professional dominance (Freidson 1974; Light 1980). They metaphorically describe themselves as grunts in the trenches under combat conditions, doing battle against two enemies—patients and attending faculty (Mizrahi 1986). This portrayal of the residency experience, epitomized in the novel *The House of God* (Shem 1978), includes descriptions of residents "turfing" patients to other services, deflecting admissions, and doing as little as possible (Shem 1978). Efficiency in this conceptualization is a coping mechanism that embittered residents use to survive the training experience.

Dimensions of Change in American Health Care

Sociological studies of the professional socialization during residency primarily draw on data from the 1950s through the 1980s. Since these studies were conducted, the delivery of health care has changed radically (Fennell and Adams 2011). These changes have altered the socialization of residents, but their impact has been incompletely explored. A partial list of the factors that have changed the context for the delivery of inpatient care makes clear why an empirical revisiting and conceptual update of medical socialization, with a particular emphasis on time management and efficiency, are necessary.

First, the discourse surrounding, the modes of appraising, and the basic understanding of health care have shifted since the classic studies of medical socialization were conducted (Starr 1984). During this earlier era, academic health centers had abundant resources and experienced tremendous growth in income, size, and power (Ludmerer 1999). The era of cost containment began in earnest in the mid-1980s with the introduction of Medicare's prospective payment system. To counter the threat to revenue posed by diagnosis-related groups (DRGs), lower reimbursement, and new restrictions on services, hospitals focused on increasing the volume of procedures they performed while decreasing patients' length of stay. Residents today are expected to see more hospitalized patients

in less time and to discharge them faster than their predecessors (Edmond 2010). An early study comparing care before and after implementation of DRGs found a 24 percent reduction in length of inpatient stay (LOS), from 14.4 to 11 days between 1983 and 1986 (Kahn et al. 1990). In 2009, the average LOS in U.S. hospitals was 4.8 days (Hall et al. 2010).

Second, measures of efficiency, quality, and safety have become more managerial and subject to external oversight. Despite progress in treating acutely ill patients, unexpected deaths and complications remain a commonplace feature of hospital life (Landrigan et al. 2010). Residents still need to provide those supervising them with acceptable reasons for unacceptable outcomes. Mastering this skill has become more difficult as medical care has become more corporate and measures of quality and efficiency have become more objective and standardized. These measures exist at an organizational level: LOS, readmissions within 30 days, rates of hospital-acquired infections, number of serious safety events, and patient satisfaction. Efficiency is also measured at an individual level: rates of patients screened for certain cancers, compliance with duty-hour limits, and appropriate antibiotic prescribing behavior. Efficiency is now a major organizing principle of health care management and hospital administration.

Third, new regulations limit the amount of time residents are allowed to work. In 2003, the Accreditation Council for Graduate Medical Education (ACGME)[1] implemented a set of rules that limit the total amount of time residents can work per week (80 hours) and per shift (30 hours). Revised in July 2011, the regulations became more stringent, further reducing the number of consecutive hours that residents (particularly those in the first year) are permitted to work (Iglehart 2010). Residency programs that violate these rules risk losing their accreditation, which has important financial ramifications.[2] These rules have been controversial, and programs have struggled to adapt (Romano and Volpp 2012). Duty-hour limits represent a significant change in the context and organization of work for residents. While there are numerous surveys of resident and attending faculty perceptions of the impact of these regulations (i.e., Antiel et al. 2011), the literature describing how residents actually behave in response to them and how this response impacts professional socialization is scant (Kellogg 2009; Szymczak et al. 2010).

In this article, we explore how the meaning and enactment of efficiency in medical residency has

Table 1. Data Collection Strategy

	Franklin (Franklin and VA Hospitals)	Lark Hospital	Able Memorial Hospital
Observation period	June–August 2008 • Immersive observations at Franklin and VA Hospitals January–May 2009 • 1 day/week observing at Franklin November 2009 and April 2010 • 3 nights observing night float resident at VA and Franklin May 2009 and 2010 • Observations at New Resident Orientation	December 2009 3 days of observation, 2 days of interviews	June 2010 3 days of observation, 2 days of interviews
Number of interviews conducted (with whom, year in program)	10 Residents: 7 Interns 2 Senior residents 1 Chief residents	20 Residents: 8 Interns[a] 10 Senior residents[a] 2 Chief residents	5 Residents: 3 Interns 2 Chief residents
Number of beds	Franklin Hospital-776 beds; large academic medical center; VA Hospital-145 beds	331 beds; small community hospital	665 beds; midsize, regional referral center

a. Focus group.

changed since the sociological studies of the 1950s to 1980s. Through an analysis of ethnographic and interview data, we explore the work of internal medicine residents in three training programs and provide an examination of the meaning and enactment of "efficiency" on the shop floor of the hospital. Our data enable a "conceptual updating" (Glaser and Strauss 1967; Timmermans and Angell 2001) of earlier sociological studies of resident socialization toward time and its management by revisiting the typical site of previous studies of the socialization of residents: the hospital inpatient ward. Unlike other themes in the "training for" literature, we find that efficiency is not focused on mastering skills that are specific to being a physician (mastering uncertainty-riddled biomedical knowledge, the maintenance of professional dominance, the management of error, and the existential crisis of dealing with death); rather it is about learning to labor within a complex health care system.

DATA AND METHODS

The qualitative data presented are part of a larger study on the influence of duty-hour regulations on residency programs. We conducted ethnographic observation and in-depth interviews with internal medicine residents affiliated with three training programs in the eastern United States. These data were collected intermittently over the course of two years (2008–2010, Table 1). The institutional review board (IRB) at all hospitals approved our study protocol.

Phase 1—Preliminary Data Collection at Franklin

We spent the majority of our time at Franklin, a large, elite residency program. The program takes three years to complete and residents participate in a number of different rotations and practice settings spread out over three hospitals. Our research team, comprising one professor of sociology (a project P.I.) and four graduate students, spent three months in the summer of 2008 observing residents as they went about their everyday work. We observed multiple teams of internal medicine residents as they provided care on a general medicine inpatient ward at the Franklin Veteran's Affairs (VA) hospital (10 weeks) and Franklin Hospital (three weeks).

Each team member spent approximately two weeks at a time shadowing individual residents on a team. We attempted to tie our observation period to scheduled shifts of target residents, focusing on daily work. We arrived at and left the hospital with them, saw patients, went to attending rounds, attended didactic conferences, observed procedures, and sat with them while they entered notes into computers. We observed their work on nights, weekends, and holidays, including spending the night at the hospital as part of their on-call responsibilities. We shadowed 12 internal medicine residents. Since residents work together in teams, we invariably spent time interacting frequently with other members of the team (typically a junior or senior resident, medical student, and attending physician).

We told residents we were interested in learning about the experience of their day-to-day work. As observers, we attempted to be as unobtrusive as possible but found that residents actively engaged with us. Each observer took jottings while observing and wrote fieldnotes at the end of each day, or as soon as possible given the constraints of scheduling. The research team met weekly to discuss ongoing data collection and emergent themes.

Using a semi-structured format that grew inductively from observations, we conducted in-depth interviews with 10 Franklin residents in early Fall 2008. We conducted the interviews after we finished our summer observations, which allowed us to ask more nuanced questions and to reflect on specific events we observed. Interviews ranged in length from one to three hours.

Phase 2—Additional Data Collection at Franklin, Site Visits at Lark and Able Memorial

After the initial round of data collection we sought to validate our findings by expanding the range of our observations. To do this we continued our observations of residents in the Franklin program at different times during the year (Table 1). We also selected two additional residency programs in the vicinity of Franklin—Lark and Able Memorial Hospital—that differed in size and structure. We visited each program for one week. During these site visits, our research team spent three days

observing internal medicine residents as they worked on a general medicine inpatient ward. We also spent two days conducting in-depth interviews with residents.

Scheduling interviews was challenging. At Lark, for example, we decided that for scheduling purposes we would conduct two focus groups, one with junior and senior residents and one with interns, instead of interviews. The program administration at Lark was receptive to our project and facilitated the scheduling of the focus groups. We encountered more resistance from Able Memorial and correspondingly had a much lower rate of participation. Although the time spent at these two additional sites was limited and the number of residents interviewed was not large, we feel that exposure to programs different from Franklin's allows us to explore potential sources of variation and the prevalence of an emphasis on efficiency.

Data Analysis

All interviews were digitally recorded and transcribed. Fieldnotes and interview transcripts were uploaded to QSR's NVivo 8 qualitative data analysis software. Analysis was largely inductive. We approached the data with an interest in resident norms about work, time, and efficiency that informed the creation of code categories. The first author coded the documents and reviewed evolving themes in meetings and memos with the second author. All names used here are pseudonyms.

RESULTS
Organization of Work for Residents— General Medicine Inpatient Services at Three Hospitals

The daily schedules for residents at Franklin, Lark, and Able Memorial largely depend on their year in the program, hospital, and rotation, but include a mix of patient care and formal didactics. The labor of patient care involves all of the work that must be done when patients are admitted to the hospital: taking a history and performing a physical exam, formulating a diagnosis, coming up with a treatment plan, putting in medical orders (blood work, laboratory tests, imaging studies, administration of

Table 2. Intern Work Week—Q4 Call System at Franklin, 2008

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
On call; receives new admissions until 9:30 pm	Post-call; leaves hospital by 1:00 pm	7:00 am to 6:00 pm; manage patients	7:00 am to 6:00 pm; manage patients	On call; receives new admissions until 9:30 pm	Post-call; leaves hospital by 1:00 pm	Day off (1 day off every 7 days averaged over a rotation)

Table 3. Intern Work Week—No Overnight Call System at Lark and Able Memorial Hospital, 2009–2010

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
7:00 am to 6:00 pm; manage patients and get new admissions (the same through Day 6)	7:00 am to 6:00 pm	7:00 am to 6:00 pm	7:00 am to 6:00 pm	7:00 am to 6:00 pm	7:00 am to 6:00 pm	Day off (1 day off every 7 days averaged over a rotation)

medication, dietary needs, physical therapy, etc.), doing procedures (lumbar puncture, placing a central line, etc.), and writing notes that document all of the aforementioned for the medical record. Residents work together in teams to provide patient care. First-year residents, known as interns, have the most intense schedule and shoulder the largest share of the labor. They are supervised by a senior (second- or third-year) resident and confer with the attending physician at rounds each day and occasionally by phone or in informal interactions throughout the day.

The workflow at each program depends on how new patient admissions are assigned to residents. The flow at the Franklin program is different from that at Lark and Able Memorial because of the way the schedule is organized (Tables 2 and 3).

At Franklin, new admissions are assigned to residents every fourth day, when their teams are "on call." A team is made up of one senior resident, two interns, and two medical students. The interns accept primary responsibility for the team's patients while the senior resident supervises, assists with tasks as needed, and conducts informal teaching. At the time of our observations, each intern was permitted to carry up to 12 patients at a time, for a cap of 24 per team.[3] During their "call day," teams admit new patients up to 9:30 pm or until they reach 24 total patients. These patients become the intern's primary responsibility, as are the still hospitalized patients admitted from prior calls. The senior resident stays at the hospital until 10:00 pm, at which point the interns provide care for the team's patients overnight.

As a result of duty-hour regulations, the program has implemented a "night float" system. The night float resident comes to the hospital in the evening and is responsible for admitting patients that arrive between 9:30 pm and 8:00 am. Interns "inherit" the patient that the night float admitted and become responsible for their care. To comply with duty-hour regulations, interns are required to leave the hospital by 1:00 pm on their "post call" day. Their senior resident provides care for the team's patients after 1:00 pm.

In addition to admitting new patients, interns, while on call, are responsible for "cross coverage." When cross covering, residents are responsible not only for their patients but also the patients of the other residents rotating on their service. For example, on the general medicine ward at Franklin VA, there are four teams of residents caring for patients. Each

night, three of the teams go home and "hand off" or "sign out" the responsibility for their patients to the on-call team. Each intern becomes responsible for up to 30 "cross-cover" patients in addition to their mix of newly and previously admitted patients. When on call, interns cover as many as 40 patients.

Lark and Able Memorial have a similar structure and schedule with the exception of overnight call. Teams are made up of one senior resident, one intern, and two medical students. Residents do not take overnight calls. Teams can get newly admitted patients at any time during their workday (7:00 am to 5:00/6:00 pm). At Able Memorial, interns are paged when a new patient comes in and go to the emergency department to perform the initial admission examination. At Lark, teams do not perform the initial admission examination. Instead, there is a senior resident (known as the 4555 resident because of their pager number) who works in the emergency room performing the admission work-up and assigning patients to teams on the general medical floor. At both programs there is a dedicated team of night float residents who accept admissions and cross cover overnight.

Cross coverage is a major part of the organization of work at all three programs. The transfer of responsibility for a patient marks the beginning and end of each workday. Residents "sign out," communicating information necessary for care of patients to the team assuming responsibility. The formal transfer of responsibility for patients between teams or to a night float is a major change in the social organization of work since the classic studies of resident socialization (Miller 1970). Today's residents must leave the hospital at a certain time and are faced with the challenge of knowing what work to hand over and how to communicate it. This feature of the training environment structures how residents understand and enact efficiency.

The Nature of Time

The residents we observed and interviewed at all three programs felt overwhelmed with their workload and did not feel that time was something they could control. That residents are overwhelmed does not represent a change in the experience of

training. What has changed is the pace of work. The residents in our study were responsible for approximately the same number of patients as residents of an earlier era—12 to 14—yet are expected to care for them in a shorter amount of time in a crowded technological environment that is more tightly controlled by formal organizational protocols (see Note 3). The interaction of these factors makes the workday feel frenzied and unpredictable for residents. For example, here is an excerpt from our Lark Hospital fieldnotes:

> It is 2:53 pm and we are rounding with the team. Sally (second year) gets a page, groans and says "it's 4555." She finds a phone to return the page. When it becomes clear that the team is going to get a new admission the attending Dr. D says to me "this is a major new source of stress for residents. The workload is so intense and the unpredictability and uncertainty of the admissions system makes planning work and carrying it out very challenging. It wasn't like this when I was training—we were at least protected from admissions some of the time."

The nature of work on an inpatient general medicine ward makes it very hard to transition from what a resident is doing at one moment to something completely different at the next, especially if it is nonemergent and unrelated to patient care. This includes attending morning report, arriving at rounds on time, eating, using the bathroom, and leaving the hospital on time. For example, these Franklin residents struggled with leaving even though they knew that not doing so by 1:00 pm violated duty-hour rules:

> I'm at the bay with Sarah [second year resident] and Peter [first year]. It is 2:00 pm. They are working on getting their sign-outs in order so they can go home. Sarah is on the phone with someone who asks her if she is still at work "I'm trying not to be here, but yes, I'm here."

To cope with the unpredictable workflow, accomplish required tasks, and comply with the constraints imposed by duty-hour regulations, residents prioritize efficiency.

Training for Efficiency

In what follows we describe aspects of a culture of efficiency that we observed in three residency programs. We did not observe variation in an overarching emphasis on efficiency or in its operational definition: the ability to prioritize, to anticipate problems, and to take action in order to accomplish tasks. While it is possible that this lack of variation is due to the limitations of our data, we believe it is more likely that efficiency is a group norm. The residents we observed exhibited a strong peer and group orientation. Being efficient in residency is no longer simply an individual skill of self-presentation whose mastery signals one's competence. We observed a considerable degree of cooperation among residents in all three programs around managing work.

That physicians in training exhibit a group orientation toward work is not a new finding—Becker et al. (1961) describe the importance in medical school of making sure that any one student does not increase the workload that all must bear and of avoiding being seen as "goldbricking." Both Miller (1970) and Mizrahi (1986:89) describe "sloughing behavior, that is sloppy or lazy management of patients . . . so that it [becomes] the responsibility of another fellow house officer to complete or rectify" as "an imposition on a colleague and, as such, an unforgivable social sin."

What conflict we did observe among residents around workload was unrelated to sloughing behavior. Instead, spending too much time with patients or taking too much time to accomplish tasks became an issue for contestation. An example from our Franklin fieldnotes stands out:

> Around noon, in the resident workroom: a senior resident, Beth, asks her intern Matt if he has finished his work. He says, "Yes, I'm done, just working on these discharge instructions." Beth says, "You need to leave if you are ready to sign out. You are post call. I can take over for you." Matt protests, "I'm almost done, I can finish!" Beth, her voice raised, says, "You need to learn to LET GO!"

We observed that a major topic of the teaching and practical wisdom passed down from resident to intern concerned the style in which they should work. Residents were critical of interns when they spent too much time with patients:

> Peter, a Franklin intern, is seeing his patients. After we finish, the husband of a patient approaches him and says that his wife cannot swallow her potassium pill. He asks Peter to consult the pharmacy to explore how she can get her potassium in a more tolerable formula. We are interrupted by a call from Sarah, Peter's senior resident, who tells him to come up to the ninth floor immediately. Assuming an emergency, Peter excuses himself and we run upstairs. We find Sarah casually leaning against the bay; there is no emergency. She tells Peter that the urgent call was a ruse. She heard he was "being tortured" by the husband of Mrs. X. She tells Peter that he is "too empathic" and to increase his efficiency he can't spend time dealing with every little complaint.

Sarah's criticism of Peter for being "too empathic" is reminiscent of the process involved in "training for detached concern" (Fox 1988; Lief and Fox 1963) except that now emotional detachment is a tool of efficiency—being emotionally invested in a patient takes too much time.

While we did observe that residents tried to avoid spending too much time with patients and families, they did not adopt an oppositional, angry attitude like Mizrahi's (1986) residents. One Franklin senior resident reflected on the challenges of reprimanding a junior colleague who spent too much time working:

> I had this intern, an excellent physician . . . he could be my doctor any day. He would break duty hours left and right and I was his senior resident, so I was freaking out, because I'm always trying to get people home at noon . . . he'd be two hours over. But what was he doing? He was calling their primary care doctors, making sure they knew what happened to their patient . . . he would call the family members, the kind of things that people want doctors to do for them, he did them all. . . . This was not a lazy person who was wasting time . . . I had to speak to [program director] about it and I said "people call him inefficient. It's really because he is doing what we all should be doing but there was not time to do it."

Throughout the summer at Franklin we observed new interns struggle with the tension between needing to be efficient and wanting to be thorough.

We also observed residents reflecting on their own performance in terms of how efficiently they worked. Much of this reflection took on a self-critical tone. We observed the following at Lark Hospital:

> We are sitting in the resident workroom at a bank of computers. Sally, the second year resident that I am shadowing, says out loud and unprompted as she types notes in the computer, "I find it hard to step back as a second year. I feel like I am a better intern than second year" (note: it is six months into Sally's junior year). Her intern, Neil laughs and says, "that is because you are too thorough." Sally continues, "I guess I have a hard time letting go . . . ." She says that in the second year she should be focusing on "stepping back" and thinking about patient problems from a level above day-to-day management. She says, "I am worried that by focusing so much on the details of the everyday I might be missing the forest for the trees."

Much of Sally's self-evaluation reflects on the operational meaning of efficiency, which we found to have greater social salience than previous studies of medical residents suggested.

Being Efficient

Residents have a more nuanced understanding of what it means to be efficient than simply providing a concise patient presentation at rounds or turfing patients to other services. During interviews, we probed residents for their operational definitions of efficiency. For our informants, efficiency involves prioritization, the anticipation of problems, and taking action to accomplish tasks. Residents identify the ability to prioritize the always multiple and competing demands on their time as a key part of being efficient. A Franklin chief resident explains:

> There are so many competing tasks in a limited amount of time, that when we say efficiency what we mean, or what we often take as a surrogate of

that is prioritization and so, if you address every task and every call and every page equally you could get nothing done. So efficiency is being able to say, "This is important now, I finish this now. This is a sick patient I need to deal with now. Taking the social history on this patient and finishing the note can take the back burner." So, it's the ability to dispense your time, which is limited, appropriately. . . . If you don't prioritize and you don't give more time to more important things and less time to less important things then you'll never get anything done.

One third-year Franklin resident reflects on the meaning of efficiency:

> You start realizing that what efficiency is, is making sure you pay the right amount of attention for the right degree of severity . . . learning the sick versus not sick. And knowing who you really have to pay attention to, or red flags, or warning signs.

This explanation highlights the other component of efficiency that a resident is required to master: anticipation.

We observed that much of the informal teaching surrounding the pathophysiology of hospitalized patients is concerned with predicting and preventing emergent situations. One Franklin senior resident impresses the following on her two interns during an informal lesson late one night on call:

> She stresses the importance of paying attention to urine and fecal retention. Patients who are unable to urinate become a "major problem and quickly." She recounts a story of a patient who couldn't urinate for 30+ hours. The nursing staff couldn't get a foley (catheter) in him and he started to crump (become acutely unwell). Eventually, they had to call a urologist who performed a surgical procedure. She says that the patient recovered completely after he was able to void and that urine retention, a common cause of crumping, is to be avoided.

We observed that residents communicate the importance of anticipation by using various code

words. The phrase "to crump" signals rapid deterioration in a patient (Coombs et al. 1993). Residents at all three programs discussed "sick" versus "not sick" patients. When we first heard this term used in the context of a routine sign out ("Is anybody on your list sick?" was a common question asked by the resident coming on duty), we were confused. Wasn't everyone in the hospital sick? We came to learn that "sick" was a code word for "might crump any minute." A "sick" patient became an object of heightened attention and concern. "Sick" is a linguistic red flag that allows residents to anticipate and prioritize tasks in the face of limited time.

Residents found resuscitation situations highly stressful and attempted to stave them off by keeping attuned to subtle changes in a "sick" patient's vital signs and proactively managing cardiopulmonary distress, or by being alert to signs that an otherwise stable patient might "crump." Avoiding emergent situations has become an important external quality metric. "Failure to rescue" patients with unexpected clinical deterioration is receiving increased attention as a measure of the quality of inpatient care (Silber et al. 2007). During our time observing at Lark hospital, a young patient with sickle cell disease developed worsening acute chest syndrome overnight that remained unidentified until he went into cardiopulmonary arrest. He was successfully transferred to the ICU and survived.

This incident occurred on the first day, and sense-making (Weick, Sutcliffe, and Obstfeld 2005) around this event reverberated through our time there. Sally, the junior resident caring for the patient, was especially distraught. From our fieldnotes:

> Sally and her attending, Dr. D, talk about what happened. Sally says she feels very badly about what happened and that it is her fault. Dr. D reassures her that she did everything that she could. Dr. D asks Sally how she signed out the patient with sickle cell disease to the night float. She asks, "Did you use the word 'sick' to describe him? Because sometimes that alerts the person getting sign out to pay extra close attention to the patient." Sally says, "Well, I didn't really think he was sick last night. He had been noncompliant with his oxygen all day so I assumed his breathing

> trouble was related to that." She tells Dr. D that the only thing she signed out on this patient was that if he were to develop a fever the night float should do a pan culture. She says she ordered a chest X-ray before she left and put it on the list of things to do overnight, but she didn't stress it. The night float did not follow up on the results overnight, as the patient got progressively worse.

Being efficient is both a social norm and a strategy that residents employ to cope with a workload whose accomplishment in the time allotted is uncertain.

Systemic Threats to Efficiency

When coding our fieldnotes we found that residents at each of the three programs would use the term "systems problem" to explain why they have difficulty being efficient. From our analysis of those utterances we found that "the system" is a catchall term that encompasses a variety of features of organizational life. Instead of developing an oppositional attitude to patients (Mizrahi 1986), residents conceptualize "the system" as an entity that works against them in their efforts to prioritize and anticipate. Through an analysis of those places where the system caused problems for residents and how they handled them, we can see how physicians in training are socialized to think about the pressures of working in a complex organization and how system problems become accepted, taken for granted, and seen as par for the course in the provision of care (Dixon-Woods 2010; Waring 2007).

People are components of the system—the consultant physician who takes hours to call back, the nurse who does not record vital signs consistently, or the social worker who refuses to put in a request for a patient to be discharged to a nursing home—threaten efficiency. Technology is also part of the system—the unfamiliar blood pressure machine whose operation is opaque, the broken electronic informed consent machines that delay completion of procedures, and the printer that will not print sign out sheets, delaying a timely exit—all of these frustrate residents' best efforts to act efficiently.

New communication technologies like cell phones are a feature of the system that challenges the enactment of efficiency (even though they are

often heralded as efficiency promoting; Wu et al. 2010). Residents at Franklin and Able Memorial carry program-issued cell phones that they are required to answer regardless of what they are doing. Administrative rules prohibit residents from setting up voicemail accounts.

During our observations at Franklin and Able Memorial, cell phones rang constantly. They interrupted formal didactics; attending rounds; physical exams; procedures; conversations with patients, their families, nurses, and ancillary staff; sign outs; and casual conversations between residents. For example, the Franklin program has an educational conference for residents from noon to 1:00 pm three times a week. When we observed at these conferences, we noted each time any attendee's phone rang. We attended 19 noon conferences and observed an average of 10 phone calls per conference, with a high of 20 and a low of 6. In one report, the same intern was called 6 times. A similar event was observed at Able Memorial when the resident we were shadowing was called out of a small lecture on diabetic ketoacidosis nine times. These data are not systematic and we cannot say for sure how generalizable they are. However, it is instructive to compare the frequency of phone calls we observed to the average frequency of pages per hour found in a 1988 study of internal medicine residents: one (Katz and Schroeder 1988).

Handoffs were also very vulnerable to being interrupted by cell phone calls, as this Franklin fieldnote suggests:

> I am in the tiny call room with Jen, an intern. She is on call and getting sign-out from Alice, an intern. We sit on the bottom bunk bed as Alice briefs us on the patients and the things that need to get done. As Alice is talking she is interrupted by three phone calls. The first from her senior resident with a question, the second from a nurse wanting an order put in (which Alice does quickly on the computer in the room, "before I forget"), and the third from the ophthalmology fellow following up on one of her patients. The fellow wants Alice to order intravitreal antibiotics [medication injected directly into the eye] and he wants them "STAT to the bedside." Alice hangs up and rolls her eyes sarcastically, "what a perfect call. STAT intravitreous antibiotics. The pharmacy is

> totally going to get on my case about this." She tells Jen she will be back to finish up the handoff later, because she has to go manage this situation. She does eventually complete the handoff about an hour later.

Hospital handoffs have received steadily increasing regulatory and research attention in the past five years (Cohen and Hilligoss 2010). There is a push to standardize handoffs to reduce the likelihood of non- or miscommunication of patient data (Starmer et al. 2012). Our observations suggest that future research and policymaking should take into account the vulnerabilities that arise due to the environment in which the handoff occurs.

Franklin and Able Memorial residents had mixed opinions about cell phones. Some liked that they cut down on the "phone tag" required by pagers, while others felt that they interfered with prioritization and anticipation. The presence of cell phones encouraged the nesting of tasks within time, as the previous fieldnote excerpt illustrates. Nesting occurred when a resident working on a task was interrupted by a cell phone call requesting her to do another task, which she must decide to attend to at that moment or at a later point. Tasks accumulate over time. Nesting contributes to the intensity of the workload and is a major threat to efficiency because keeping situational and attentional focus becomes problematic as the number of tasks multiplies. Nesting is not merely a matter of interruption, it is also a matter of tasks that require different levels of attention and action arising rapidly and unexpectedly.

The spatial and socio-temporal rhythms of the hospital as a complex organization are another barrier to the efficiency that residents strive to achieve. Examples that we observed include: the code call that demands an immediate response, received while seeing patients in another building three blocks away that cannot be reached by the normal route because access is blocked by new construction; the STAT CT scan that cannot be ordered on a holiday weekend; or the phlebotomy team that refuses to draw blood on a patient if called after 4:30 pm, even though they are supposed to be on call until 5:00 pm.

Residents at both Lark and Able Memorial identified the way the hospital assigned new

admissions to teams (Table 3) and the night float cross coverage model as problematic aspects of "the system." These challenges, all of which we observed or were told were a "systems problem," highlight why residents often express uncertainty about whether they are able to achieve what is expected of them in the time required. The residents in our study still train for uncertainty (Fox 1957), but the uncertainty that they must learn to manage primarily arises from the process of moving patients through a fragmented and complex health care system, rather than from epistemic quandaries.

The poor meshing of multiple interacting systems has been identified as a major contributor to medical error in the human factors approach to improving patient safety (Peters and Peters 2007). Systems discourse is the main way hospital policies concerning adverse events are organized and communicated. Residents in our study use systems language to describe the problems that come from working in a complex health care organization, as well as for making sense of specific incidents (Waring 2007). Tom, an intern, describes the challenges of working efficiently at Franklin:

> I think it's mainly in the hospital settings that knowing who to call is the big issue for my efficiency. I don't know all the right numbers to call. I don't know who's the right person to contact if I need to get something done. I still struggle with that because . . . I'm not sure why I still struggle with it. I've been there for a while now. But I think this hospital is so big and it's such a lumbering beast . . . there's so many people making decisions that it's hard to figure out who to call. *That's a systems problem and not an intern problem.*

By suggesting that his confusion over whom to call is a systems problem and not an intern problem, Tom locates interns outside of and against "the system."

This kind of oppositional thinking toward the challenges posed by the system permeates the culture of efficiency we observed. The latent message here is that while physicians must work within the system, they are not a part of it. As a result, residents do not feel responsible for enacting change

within the system. Instead, they attempt to maneuver within the constraints that the system presents.

Linda, a Franklin medical student, expressed the futility of trying to change the system during a discussion of a near miss on rounds: "As an individual you feel very futile with these system level errors. I'm only here for a few weeks, what can I do?" This feature of the residency experience encourages the development of a "learned tolerance" of systems problems that leads to the acceptance of adverse events as normal, natural troubles of providing inpatient care (Dixon-Woods et al. 2009; Waring 2007).

In order to cope with systemic threats to efficiency, residents learn to master workarounds to problems caused by "the system." A basic example from our Franklin fieldnotes concerns the acquisition of supplies for a patient:

> I see Nate (an intern) come into the resident room with two opened packages of chux (absorbent pads), which he puts in his locker. He says, "I'm stealing these for one of my patients who needs them." Anne (an intern), who is sitting at a computer, says "you know you can go through outpatient meds for that." Nate says "yeah, but I'm not going to go through that."

In this case "going through that" involves logging on to a computer to place a formal order; for Nate, pilfering from the supply room takes less time and ensures the chux are available when needed.

Other workarounds concerned the problems encountered when trying to communicate with consultants from other departments. Residents employed a number of strategies to get consultants to call back more quickly:

> I am sitting in the workroom with Lana, an intern and Eric, her senior resident. Lana has been on hold for 10 minutes. She needs to get a cardiology consult to prescribe one of her patients a specific medication. She is having a hard time getting a return call and needs an answer sooner rather than later. Eric tells her to ask them to write a quick note authorizing the medication. He explains that this will get them down here faster because they won't write the note without doing the consult. Lana says "oh, clever!"

While these workarounds on the surface seem to be shortcuts that residents take to get their work done, we argue instead that they represent teachable moments in which lessons about accountability, the feasibility of system improvement, and professional identity are imparted.

DISCUSSION

In this ethnographic study of internal medicine residents from three different training programs, we find that a "training for efficiency" (TFE) ethos is the predominant value organizing the professional and occupational culture of residency. The TFE ethos, unlike other themes in the "training for" literature, is not focused on mastering skills that are specific to being a physician (mastering uncertainty-riddled biomedical knowledge, the maintenance of professional dominance, the management of error, and the existential crisis of dealing with death); rather it is about learning to labor within a complex health care system. While the mastery of these skills remains important, they become manifest within the context of systems challenges that make efficiency a primary emphasis in displaying competence. For example, while the residents in our study still needed to come to terms with the inherent uncertainty of biomedical knowledge and impossibility of learning everything, both concerns blended into the background of our observations. In those instances where residents were unsure about what dosage of a medication to order or how to manage a clinical problem, they would reference UpToDate, an online clinical decision support system. Technology has partially mitigated the stress of epistemic uncertainty. These earlier identified dynamics are not absent from the current socialization experience of residents; rather, they manifest in new and different ways because the context of providing inpatient care has changed. This analysis is an effort to update these concepts so our understanding of medical socialization is better aligned with the changed context of inpatient hospital care.

We illustrate how the meaning of efficiency has changed since the classic studies of resident socialization. While efficiency has always been an important part of resident performance, it has gained greater social salience. The dramatic changes to the delivery of inpatient hospital care in the United States in the past 20 years have in all likelihood played a role in the redefinition of efficiency. In previous sociological literature, efficiency was conceptualized on an individual level. We illustrate that efficiency has evolved into a group norm that residents use to critique themselves and others about the style in which they should work. We also show that efficiency entails a set of cognitive and interactional skills—prioritization and anticipation—that are necessary to overcome the challenges of providing care in a complex organization with a limited amount of time.

There is a theme in much of the sociological literature on resident socialization that depicts residents developing antagonistic feelings toward certain patients because they are challenging to deal with and symbolize the absurdity of many aspects of hospital care (Mizrahi 1986). In our study, we did not find that residents held antagonistic feelings toward patients and instead depicted themselves primarily in opposition to "the system." "Systems" constraints pose the biggest threat to efficiency that are outside residents' control. Residents direct their resentment to a complex set of demands that are embedded in an opaque system and respond to these barriers to efficiency by working around them. Workarounds may well have negative unintended consequences. Things get dropped in the space between the formal and informal ways of doing things (Dixon-Woods et al. 2009). Clean supplies stored in a locker, not in the always-locked-and-difficult-to-access sterile central processing unit, could become contaminated and lead to a hospital-acquired infection (HAI).

When residents employ workarounds to deal with "systems issues," no matter how small, they implicitly accept problems in the way that care is delivered. Implicit acceptance of these problems encourages complacency about vulnerabilities in the provision of hospital care that may have serious consequences for patient safety. As hospitals look to apply principles of high reliability organizing to improve patient safety and quality, it is worthwhile to consider the way physicians in training are socialized to think about the barriers to providing patient care in complex health care organizations (Hines et al. 2008).

A tolerance of "systems issues" also has implications for the professional identity of young physicians and their orientation toward efforts at organizational change in their future practice. Many hospitals in the United States are actively engaged in improvement work to make the care they provide safer and of higher quality. For example, there is a national push to reduce the rates of HAI through the implementation of basic infection prevention practices. Although simple, these changed practices require considerable engagement, commitment, and buy-in from frontline clinical staff (Dixon-Woods et al. 2011). The literature on quality improvement in health care documents how difficult it is to obtain this engagement from physicians (Taitz, Lee, and Sequist 2011). Our findings suggest that the explanation for physician resistance to quality improvement work may not only be a function of the fact that they feel they do not have enough time. The ways that young physicians are socialized into medical culture in complex health care organizations influence the way they define their responsibility for change.

Our study has limitations. The primary drawbacks include a short amount of time in the field at two of the program sites and limited interview sample size. Although we only spent a short amount of time at Lark and Able Memorial, we felt confident that we developed a thorough sense of the way residents approached and thought of their workflow. We were able to ask more focused questions to refine the themes we had found at Franklin and to determine if the emphasis on efficiency was a product of Franklin's elite status or the size of its hospital and complexity of patients. In our extended time observing at Franklin, we made an effort to search for negative cases and checked back to see if the interns we had shadowed in the summer had developed any new ways of understanding efficiency. Another limitation of our study is a limited interview sample size. Our close relationships with many of the respondents from Franklin and from those residents at Lark and Able Memorial that we shadowed during our three-day period encouraged open and honest conversation in the interviews and focus groups.

Despite these limitations, our data provide important insight into the way medical residents are socialized to think about work, time, and efficiency in hospital settings in which reduced costs,

improved efficiency, and greater safety are all organizational goals. More work is needed in other settings and across specialties to assess the extent of the TFE ethos, describe its forms in a broader range of health care institutions, and clarify how specific regulations shape physician socialization.

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NOTES

1. The Accreditation Council for Graduate Medical Education (ACGME) is a national organization responsible for the accreditation of post-MD medical training programs in the United States.
2. Medicare provides approximately $9.5 billion a year in support for accredited residency programs (Association of American Medical Colleges 2011).
3. The 2011 revisions to duty-hour regulations reduced the cap for interns to 10 patients.

REFERENCES

Anspach, Renee R. 1988. "Notes on the Sociology of Medical Discourse: The Language of Case Presentation." *Journal of Health and Social Behavior* 29:357–75.

Antiel, Ryan M., Scott M. Thompson, Frederic W. Hafferty, Katherine M. James, Jon C. Tilburt, Michael P. Bannon, Philip R. Fischer, David R. Farley, and Darcy A. Reed. 2011. "Duty Hour Recommendations and the Implications for Meeting the ACGME Core Competencies: Views of Residency Directors." *Mayo Clinic Proceedings* 86:185–91.

Arluke, Arnold. 1980. "Roundsmanship: Inherent Control on a Medical Teaching Ward." *Social Science and Medicine* 14:297–302.

Association of American Medical Colleges. 2011. "What Does Medicare Have to Do with Graduate Education?" Washington, DC: Association of

American Medical Colleges. Retrieved January 26, 2012 (https://www.aamc.org/initiatives/gmefunding/factsheets/253372/medicare-gme.html).

Becker, Howard S., Blanche Geer, Everett C. Hughes, and Anselm L. Strauss. 1961. *Boys in White: Student Culture in Medical School*. Chicago, IL: The University of Chicago Press.

Bosk, Charles L. 1979. *Forgive and Remember: Managing Medical Failure*. Chicago, IL: The University of Chicago Press.

Bucher, Rue and Joan Stelling. 1977. *Becoming Professionals*. Beverly Hills, CA: Sage.

Cohen, Michael D. and P. Brian Hilligoss. 2010. "The Published Literature on Handoffs in Hospitals: Deficiencies Identified in an Extensive Review." *Quality and Safety in Healthcare* 19:493–97.

Coombs, Robert H., Sangeeta Chopra, Debra R. Schenk, and Elaine Yutan. 1993. "Medical Slang and Its Functions." *Social Science and Medicine* 36:987–98.

Dixon-Woods, Mary. 2010. "Why Is Patient Safety So Hard?" *Journal of Health Services Research and Policy* 15(suppl):11–16.

Dixon-Woods, Mary, Charles L. Bosk, Emma L. Aveling, Christine A. Goeschel, and Peter J. Pronovost. 2011. "Explaining Michigan: Developing an Ex Post Theory of a Quality Improvement Program." *The Milbank Quarterly* 89:167–205.

Dixon-Woods, Mary, Anu Suokas, Emma Pitchforth, and Carolyn Tarrant. 2009. "An Ethnographic Study of Classifying and Accounting for Risk at the Sharp End of Medical Wards." *Social Science and Medicine* 69:362–69.

Edmond, Michael B. 2010. "Taylorized Medicine." *Annals of Internal Medicine* 153:845–46.

Fennell, Mary L. and Crystal M. Adams. 2011. "U.S. Health-Care Organizations: Complexity, Turbulence, and Multilevel Change." *Annual Review of Sociology* 37:205–19.

Fox, Renée C. 1957. "Training for Uncertainty" Pp. 207–41 in *The Student Physician*, edited by R. K. Merton, G. Reader, and P. L. Kendall. Cambridge, MA: Harvard University Press.

Fox, Renée C. 1988. *Essays in Medical Sociology: Journeys into the Field*. New York, NY: John Wiley & Sons.

Freidson, Elliot. 1974. *Professional Dominance: The Social Structure of Medical Care*. Chicago, IL: Aldine.

Glaser, Barney and Anselm Strauss. 1967. *The Discovery of Grounded Theory*. New York: Aldine de Gruyter.

Hall, Margaret Jean, Carol J. DeFrances, Sonja N. Williams, Aleksandr Golosinskiy, and Alexander Schwartzman. 2010. "National Hospital Discharge Survey: 2007 Summary." *National Health Statistics Reports* 29(October 26):1–24.

Hines, Stephen, Katie Luna, Jennifer Lofthus, Michael Marquardt, and Dana Stelmokas. 2008. "Becoming a Highly Reliable Organization: Operational Advice for Hospital Leaders" (AHRQ Publication No. 08-0022). Rockville, MD: Agency for Healthcare Research and Quality.

Iglehart, John K. 2010. "The ACGME's Final Duty-Hour Standards—Special PGY-1 Limits and Strategic Napping." *The New England Journal of Medicine* 363:1589–1591.

Kahn, Katherine L., Lisa V. Rubenstein, David Draper, Jacquelin Kosecoff, William H. Rogers, Emmett B. Keeler, and Robert H. Brook. 1990. "The Effects of the DRG-Based Prospective Payment System on Quality of Care for Hospitalized Medicare Patients." *Journal of the American Medical Association* 264:1953–55.

Katz, Mitchell H. and Steven A. Schroeder. 1988. "The Sounds of the Hospital." *The New England Journal of Medicine* 319:1585–89.

Kellogg, Katherine C. 2009. "Operating Room: Relational Spaces and Microinstitutional Change in Surgery." *American Journal of Sociology* 115:657–711.

Landrigan, Christopher P., Gareth J. Parry, Catherine B. Bones, Andrew D. Hackbarth, Donald A. Goldmann, and Paul J. Sharek. 2010. "Temporal Trends in Rate of Patient Harm Resulting from Medical Care." *The New England Journal of Medicine* 363:2124–34.

Lief, Harold I. and Renee C. Fox. 1963. "The Medical Student's Training for Detached Concern." Pp. 111–23 in *The Psychological Basis of Medical Practice*, edited by H. I. Lief, V. F. Lief, and N. R. Lief. New York, NY: Harper and Row.

Light, Donald. 1980. *Becoming Psychiatrists: The Professional Transformation of Self*. New York, NY: WW Norton.

Ludmerer, Kenneth. 1999. *Time to Heal: American Medical Education from the Turn of the Century to the Era of Managed Care*. Oxford: Oxford University Press.

Miller, Stephen J. 1970. *Prescription for Leadership: Training for the Medical Elite*. Chicago, IL: Aldine Publishing Company.

Mizrahi, Terri. 1986. *Getting Rid of Patients: Contradictions in the Socialization of Physicians*. New Brunswick, NJ: Rutgers University Press.

Mumford, Emily. 1970. *Interns: From Students to Physicians*. Cambridge, MA: Harvard University Press.

Peters, George A. and Barbara J. Peters. 2007. *Medical Errors and Patient Safety: Human Factors in Medicine*. Boca Raton, FL: Taylor & Francis Group.

Romano, Patrick S. and Kevin Volpp. 2012. "The ACGME's 2011 Changes to Resident Duty Hours: Are They an Unfunded Mandate on Teaching Hospitals?" *Journal of General Internal Medicine* 27:136–38.

Shem, Samuel. 1978. *The House of God*. New York, NY: Dell Publishing.

Silber, Jeffrey H., Patrick S. Romano, Amy K. Rosen, Yanli Wang, Orit Even-Shoshan, and Kevin G. Volpp. 2007. "Failure-to-Rescue: Comparing Definitions to Measure Quality of Care." *Medical Care* 45:918–25.

Starmer, Amy J., Nancy D. Spector, Rajendu Srivastava, April D. Allen, Christopher P. Landrigan, Theodore C. Sectish, and the I-PASS Study Group. 2012. "I-PASS, a Mnemonic to Standardize Verbal Handoffs." *Pediatrics* 129:1–3.

Starr, Paul. 1984. *The Social Transformation of American Medicine*. New York, NY: Basic Books.

Szymczak, Julia E., Joanna V. Brooks, Kevin G. Volpp, and Charles L. Bosk. 2010. "To Leave or to Lie? Are Concerns about a Shift-Work Mentality and Eroding Professionalism as a Result of Duty-Hour Rules Justified?" *The Milbank Quarterly* 88:350–81.

Taitz, Jonathan M., Thomas H. Lee, and Thomas D. Sequist. 2011. "A Framework for Engaging Physicians in Quality and Safety." *BMJ Quality and Safety in Healthcare,* published online July 14, doi: 10.1136/bmjqs-2011-000167.

Timmermans, Stefan and Alison Angell. 2001. "Evidence-Based Medicine, Clinical Uncertainty, and Learning to Doctor." *Journal of Health and Social Behavior* 42:342–59.

Waring, Justin J. 2007. "Doctors' Thinking about 'the System' as a Threat to Patient Safety." *Health* 11:29–46.

Weick, Karl E., Kathleen M. Sutcliffe, and David Obstfeld. 2005. "Organizing and the Process of Sensemaking." *Organization Science* 16:409–21.

Wu, Robert C., Dante Morra, Sherman Quan, Sannie Lai, Samira Zanjani, Howard Abrams, and Peter G. Rossos. 2010. "The Use of Smartphones for Clinical Communication on Internal Medicine Wards." *Journal of Hospital Medicine* 5:553–59.

Bios

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