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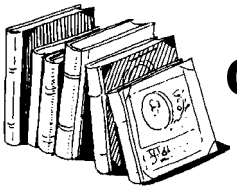

Commentaries

EBM: Evidence-based Medicine or Experience-based Medicine?

Evidence based medicine (EBM) is the practice of medicine based as much as possible on double blind, placebo controlled data, But it will never be possible to test every treatment in every clinical situation. When should trials be done when the preliminary, but not objective, controlled, data suggest that the intervention is actually either not going to work or will make matters worse? The importance of addressing this question arose in my mind only in recently when I read an article on treating one aspect of **Parkinson's disease (PD)**. It mentioned that a single drug had been shown effective for a problem, that two others had been shown ineffective and the rest had only been the subject of case reports and open label series. Hence, the article concluded, suggestions related to the use of these drugs had to wait until evidenced based medicine would point to their being useful or not. This would have attracted my attention anyway, but it raised my interest because this implication was present in two other articles I read on the topic, namely that recommendations would have to wait for controlled clinical trials.

Last year a renowned stroke expert neurologist was asked to give a plenary session to the several thousand member audience of the American Academy of Neurology on the pitfalls of relying too heavily on EBM. He presented a case of a person who didn't fit exactly into the criteria addressed by the various clinical trials in treating stroke. The general recommendations derived from EBM would be that she not be treated. In fact, several branch points in decisions about her care put her into the "don't treat" category, but close inspection would reveal that these recommendations didn't really apply to her since her medical profile put her outside the inclusion criteria for the studies from which EBM could make recommendations. And, of course, it is obvious on even minimal inspection, that many patients we see in everyday life would not have qualified for the various trials upon which EBM is based. On the other hand, studies do need to restrict inclusion and exclusion criteria or each study could be reduced to absurdities. Pity the poor FDA. If a study excluded diabetics, the FDA would clearly state that a treatment has not been proven for diabetics, but if a study excluded several smaller populations, it is unlikely that the FDA would limit use of the drug strictly to the population studied.

EBM is a useful construct, but it is, in fact, a construct, a set of guidelines, not a mandate. When deviating, one must justify why the choices were made rather than citing the "expert recommendations" derived from EBM. In the publications which upset me the authors were unwilling to make commonsense recommendations. Let me be specific. A relatively common side effect of the drugs to treat motor symptoms of PD cause patients to develop hallucinations and less commonly paranoid delusions. It has become accepted therapy to treat these with antipsychotic drugs. Two of these drugs don't cause motor symptoms to worsen but all the others do. Of the ones which do cause this problem only one has been studied in controlled trials, which earned it a "black box" warning as contraindicated in PD. The other drugs were not subjected to such trials, hence spared the black box warning. Interestingly however, several small series of isolated cases have been published in which PD patients did well on these drugs. Which is understandable if one realizes that there is a wide spectrum of sensitivities to the drug throughout the population. On the other hand, all specialists in the field have seen these drugs cause parkinsonism in otherwise healthy schizophrenics. It is a well known and universally accepted observation, so that the jump from observing this in those with normal mobility to expecting worsened motor function in those already parkinsonian is not a leap of faith. It is expected. In addition, the authors of these sanguine reports have not been recognized experts in the field.

My question is, when does one require level 1 evidence of a *problem* before advising colleagues to avoid certain treatments? It is surely not possible to study every intervention in every scenario and if a drug causes a certain side effect in a population at low risk, one can reasonably infer that it will cause the same side effect, or worse, in a vulnerable population. We cannot study everything. Medicine, despite the various advances is still an art based on science and the science has its limitations. Not only that, but it will always have these limitations, now matter how closely we come to the *Star Trek* model of whole body scans for all ailments.

At a recent lecture I heard strong evidence suggesting that certain identified genes play a role in causing disease and in drug response. These are not yet available for testing, but probably will be soon, but who is going to pay for this? Some insurers won't even cover gene testing for Huntington's disease, which would not only improves quality of life for a family, but saves a far greater amount spent on unnecessary testing. How can we think they'll pay for testing to allow us to choose one symptomatic, non-curative therapy over another?

There will always be a need for experience based medicine as well as evidenced based medicine and the two must go hand in hand and will continue to do so until the end of time, or at least until there isn't any more disease needing treatment. Good clinical judgment represents the proper amalgam of the two EBM's.

– Joseph H. Friedman, MD

Disclosure of Financial Interests

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So Frail and Fleeting a Thing Is Man

Frailty comes in various sizes and guises. There is frailty of moral character, frailty of self-confidence, even frailty of passions; but, most commonly, there is frailty of physical strength and bodily integrity. Frailty, or its sibling, fragility, is a word that is charged with intense emotional feelings. Things are never mildly frail, or marginally fragile. Most believe that if something is frail, then it is very frail.

Yet the word, frail, offers some linguistic latitude. Consider, for example, how this liberality is displayed in two quotations from Shakespeare: In the first, Hamlet berates his mother for remarrying so quickly after the mysterious death of her former husband. He exclaims bitterly, "Frailty, thy name is woman." And in the second instance Falstaff, when confronting his excessive obesity, sadly reflects: "Thou seest I have more flesh than another man, and therefore more frailty." In neither sentence is there a literal sense of an object displaying the physical qualities of dilapidation or friability; yet in both, the word remains faithful to its more metaphoric interpretation of something akin to fragility, an integral weakness that can be readily achieved: first, a marital commitment too fragile for Hamlet's censuring taste; and the second, a recognition that corpulence is not added robustness but rather a frail departure from a healthy norm (much as the word, malnutrition, currently defines marked obesity as well as the effects of an impoverished diet.).

Medicine, when it employs the word, frailness, uses it in a very narrow, literal sense. It asks: what qualities, physical or behavioral, makes this particular human deserving of the diagnosis of frailty ? Certainly the frail person, usually but not always elderly, is easy to recognize by mere physical appearance, indecisive gait, fragile voice, gaunt habitus and hesitant behavior. But somewhere between the robust sixty-year-olds who play winning tennis three evenings a week and the fragile persons protected within an assisted living facility, there must be a vast population of seemingly robust persons deserving perhaps of a more sheltered environment if tests might demonstrate that the trajectory of their lives is swiftly entering a new diagnostic zone of what might be called pre-fragility.

Fully developed medical frailty is closely associated with frequent falls (and associated bone fractures), non-compliance with elementary health-preserving steps, malnutrition, increased susceptibility to systemic infection, increased mental confusion and apathy, significantly higher morbidity and mortality rates, emotional depression and diminished self-esteem. And so, medicine seeks ways of detecting the earliest beginnings of frailty under the presumption that the full measure of frailty can be aborted or at least delayed by active clinical intervention.

Geriatricians have sought simple, quasi-quantitative measures of emerging frailty, faintly discernible frailty, that might be detected in minutes without the encumbrance of diagnostic machinery. Yet no single objective test yet exists to identify those about to enter the world of the frail personage. Its recognition rests, then, upon the intuitive judgment of those, such as nurses and geriatricians, who are sensitive to the body language—as expressed over time—heralding the emergence of the earliest signs of body fragility.

But then there is frailness solely of character seen in both the anorectic and the corpulent, the aged and the youthful. This kind of weakness in character bears little resemblance to the physical frailties observed by geriatricians. And this kind of behavioral frailty may even lend a bit of charm to otherwise undistinguished persons. Perfection in others, after all, is so dismaying that it forces us to seek out the winsome, redeeming flaws in each of us, flaws that we might call quirks; and so imperfect behavior, wildly idiosyncratic behavior, paradoxically, brings us closer to each other, as we silently rejoice in our imperfect humanity.

Cynics believe that aging increases our flaws; and if not augmenting their numbers, at least turning each flaw, each frailty to become more withered, more exaggerated, more repellent. And so it is heart-warming to think alternately that old age represents a time when mellowness has begun to accept our imperfections, when humor has softened our sharp edges, when acceptance has supplanted our numberless frailties; and when men and women have the courage to look back at the tapestry of their lives with neither fear nor distaste and rejoice in the reality that the fabric is not totally tattered.

– Stanley M. Aronson, MD

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Disclosure of Financial Interests

Stanley M. Aronson, MD, and spouse/significant other have no financial interests to disclose.

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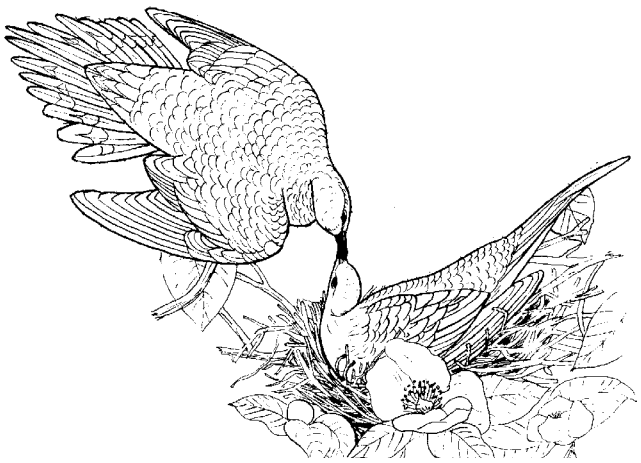

The Changing Paradigm in Residency and Fellowship Training: Embracing the Future

Staci A. Fischer, MD, FACP, FIDSA

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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Surgical Education on a Fixed Income

Thomas Miner, MD, and David T. Harrington, MD, FACS

The pace of change in our modern world is swift. Medicine—and medical education in particular—are not immune. Program Directors and Graduate Medical Education Committees are inundated by proposed initiatives and published requirements by our certifying and accrediting bodies. The impact of each change (whether related to duty hours, clinical experience, documentation, or other less tangible issues) must be assessed in the setting of current program structure and available local resources—which may be limited in some programs.

Two reform initiatives in the past decade have dramatically changed General Surgical education. The first initiative, driven externally by pressure from public safety proponents and the press, was the 80 hour a week residency duty restriction instituted in 2003. The second initiative, driven internally through the **Accreditation Council for Graduate Medical Education (ACGME)**, was the educational reform initiative of the six core competencies, discussed elsewhere in this issue. While the 80-hour restriction has been the stronger driver of change, both of these initiatives have had a significant impact on the training of future surgeons. These changes forced a careful assessment of the "core business" of surgical education and a redesign of surgical residency training to maximize efficiency. Moving from the traditional apprenticeship model of training, where residents participated in all aspects of surgical care required to become a competent surgeon without concern for the hours of training, surgical educators have had to evaluate the specific educational value of each resident's experience. As the curriculum becomes more streamlined, educators are forced to make difficult choices—e.g.,if something is to be added, what is to be discarded?

Even before the changes of the last ten years, graduate surgical education in the United States was one of the best systems in the world. The structure of the training was built on the principles described by Dr. William Halstead in 1910-1920, which emphasized a supervised, intense patient care experience and ascending levels of responsibility over the period of training. Most surgical training programs in the US were built around five years of clinical experience on busy clinical services, augmented by selected educational conferences. Since there were no duty hour restrictions many surgery residents worked more than 100 hours a week. This intense workload assured a comprehensive surgical experience and development of competence in all aspects of surgical care, including recognition and treatment of postoperative complications.

The reduction of duty hours has led to a curtailing of the number of patient encounters and technical experiences. Opponents of the duty hour restriction argued that this would weaken the educational process and lead to production of a less qualified surgeon at the end of five years of residency training. Some surgeons feel that residency should be extended to six or seven years to compensate for the loss of clinical experience, but the funding for these additional years is non-existent. Program directors were left with a choice between eliminating redundant or non-essential experience from the curriculum or adding physician extenders to the clinical services, such as nurse practitioners and physician assistants. Adding these practitioners has resulted in less clinical experience for the surgery resident. Most surgical training programs have instituted a combination of these two choices. It is estimated that the 80-hour work week cost the medical system two billion dollars a year in increased salaried positions. The total cost since its inception is over 16 billion dollars. Though very expensive, the result of this reform is a more intentionally built educational process. One could say that surgery residents are working "smarter, not harder." This process is akin to balancing a household budget, but instead of money, surgical program directors balance duty hours based on the educational needs or priorities of the residents. There are concerns that clinical experiences have been cut too severely and that the residents are not as prepared at the end of their training to practice independently. There appears to be some data to support this contention especially from European centers where duty hour restrictions have a longer history.[1] Residents themselves are increasingly choosing to pursue fellowship training. This decision may reflect their sense that they have not mastered the body of knowledge and that they require further time in a supervised educational experience.

As mentioned previously the 80-hour work week was intended as a patient safety initiative. Many patient safety advocates and the lay press have proposed that the tired resident was, to a large degree, responsible for poor patient outcomes. The logic was that a fatigued resident, who is often compared to an inebriated person, is prone to judgment and technical errors that will cause harm to patients. However, there is no clear evidence that the reduction of resident duty hours has improved patient safety. The most definitive study on this is a study in 8.5 million hospitalized Medicare beneficiaries.[2] The authors classified five levels of hospitals based on degree of resident density. They performed a risk-adjusted analysis of mortality in these five groups of hospitals for three years before and two years following the 2003 duty hour mandate. Their hypothesis was that duty hour restrictions and (thereby) less fatigued residents should benefit patient safety. Therefore, a disproportionate improvement in outcomes should be witnessed in the hospitals with the highest density of residents. What they found was that all hospitals showed modest improvements in outcomes but that there was no difference among the five groups. It appears that all hospitals, regardless of resident penetrance, are improving the care delivered, likely the result of the myriad initiatives for improving outcomes in medicine. An interesting conclusion drawn from this study is that excessive duty hours and resident error do not appear to be the primary problem for patient safety as was once thought. The explanation is either that the system of care delivered in American hospitals has checks and balances such that fatigued residents are not allowed to harm patients, that residents

are still too fatigued and that further reduction in duty hours are needed before a benefit in terms of patient safety can be seen, or that while fatigue was reduced, another problem may have been created or accentuated. There is no consensus as to what the etiology may be, but many commentators believe that byproducts of the duty hour restriction are shorter shifts and more reliance on sign out or transitions of one care team to another care team. Sign-outs require good communication, and poor communication is the number one cause of medical error. In solving one problem another may have arisen. One study evaluated the quality of sign-out between residents by interviewing groups of residents before and after signouts to the next care team by researchers. The most alarming fact of the study was that when resident A signed out to resident B, what A felt was the one most important fact that A wanted to impart to resident B, was recalled by resident B only 40% of the time. To solve this problem is difficult. If enough time is provided to perform sign-out, this time takes away from direct patient care, an essential part of training. Even if enough time for sign-out is provided, is critical data passed along? Do patients get better care from someone who knows the patient better but is fatigued or from someone who is rested but does not know the patient as well? Obviously all patients would prefer to be cared for by someone who knows them well and who is well rested. How is this accomplished? There may be technical solutions—e. g., we have an electronic sign-out system at Rhode Island Hospital which carries critical information and keeps up-to-date medications and laboratory values. The **electronic medical record** (**EMR**) may be a solution but the user interfaces of these systems are often so cumbersome that they reduce physician efficiency rather than improve it.

An area that many programs, including our training program, are exploring is to improve the sign-out accuracy. Each morning our trauma service at Rhode Island Hospital, which admits over 3,000 patients a year with traumatic injuries, convenes to discuss all of the new patients admitted the night before and the current inpatient census. In order to do this rapidly and accurately the residents are supervised by faculty who can offer comments, instructions, and assess the thinking and judgment of the resident team as they sign-out to each other. This morning report is a significant investment of time and energy of the trauma faculty, but this process has become vital for the process of patient care and resident education. We are currently investigating whether we can improve the communication skills and teamwork skills of the trauma residents in the Rhode Island Hospital trauma bays. These experiences can be superficially duplicated in a simulation center but the reality of the trauma bay creates a better educational environment. With the faculty present, the residents care for the patient and are simultaneously evaluated for their ability to arrive at an accurate diagnosis and their ability to communicate effectively with all members of the team.

One proposed solution to the current challenges of surgical education is simulation training.

One proposed solution to the current challenges of surgical education is simulation training. Simulation training has been shown to have great impact on aviation safety and this same process may be similarly successful in surgery. It is reasoned that surgery is a highly technical field and therefore applicable to this technology. There are two errors in this thinking: the first is that technical errors are the major cause of complications in surgical patients, and second is that surgical education is primarily training in technical expertise. Surgeons with good clinical outcomes share technical proficiency, but more importantly good clinical judgment. They know when to operate, when not to operate, and how to manage complications when they arise. The current state of surgical simulation is very primitive and not yet able to address these issues.[3] With continued innovation and significantly more financial investment, surgical simulation will one day be a useful adjunct to surgical training, but currently the technology is far behind and the data supporting its routine use weak. One additional unintended consequence of simulation training is that it pulls surgery residents from the most important person—the patient. In thinking about surgical training and the educational budget, every hour on an inadequate simulator is an hour away from learning from direct patient care.

At some point chairmen of surgery and program directors in surgery have to put their imprimatur on the resident and certify him or her as trained. Therefore during their training residents must be given ascending levels of responsibility under supervision so that their judgment can be assessed. This is where the conflict between resident education and patient safety is most acute. Training programs in surgery have years of experience managing this conflict. Systems of education, supervision, and dedication to excellence allow us to offer an ascending level of responsibility simultaneous with provision of quality patient care. The six ACGME core competencies on which all programs teach and evaluate residents—patient care, medical knowledge, communication, professionalism, system-based practice and practice-based learning—forced program directors a decade ago to look at all areas of competency and not just the areas that would normally draw the closest scrutiny—knowledge and patient care. Before the introduction of the six core competencies, training programs certainly taught and evaluated residents in these domains, but a more precise definition of these areas challenged modern program directors to refine their methods. For instance, practice-based learning, which is the ability to learn from patient outcomes and improve patient care, was generally covered in surgical curriculum by a journal club where articles covering state-of-the-art science were discussed. The assumption was that this teaching would diffuse into the care of the patients. Our solution to the new requirements for practice-based learning at Brown is to have all PGY2 residents do a two-year quality improvement project with faculty proctoring. This allows an identification of a current clinical problem, a review of the current literature, collection of data, and designing and implementing a solution to the problem based on lessons learned from the project. This process is educational,

sets an expectation of future behavior and improves the care of patients. This process is one of many examples of the benefits of modern surgical education and their impact on teaching hospitals.

The 80-hour work week was an expensive, radical challenge to surgical education. Though there have been some significant unwanted and pernicious changes because of its promulgation, surgical education benefited from the house-cleaning or the budget-balancing that it engendered. These duty hour restrictions demand that program directors understand that they are working on a fixed income. Further challenges to the surgical curriculum await. The introduction of the electronic medical record, which currently reduces clinician efficiency, will put additional time pressure on surgical house officers. This July, new ACGME rules will limit PGY1 residents to 16 hour shifts and increase the requirement for their supervision. Further reductions to the limit of 80 hours might also be in the future. Surgical programs that are more intentionally designed and based on sound educational principles, will be better equipped to face these challenges. The programs will be filled with excellent residents, for the number and quality of applicants to surgery programs has increased. The last ten years have been a real challenge but the future is bright. Don't worry, there will be a well-trained surgeon there when you need one.

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Challenges in Primary Care Education

Adam Pallant, MD, PhD, Kelly McGarry, MD, and Dominick Tammaro, MD

The Past

Training in the traditional primary care disciplines (Family Medicine, Internal Medicine, Medicine-Pediatrics and Pediatrics) has faced a decline in interest among US Medical School Seniors for several years as supported by the following data:[1]

- Primary Care Internal Medicine Residency programs declined from 82 in 2000 to only 50 in 2009, with the number of positions offered through the **National Resident Matching Program** (**NRMP**) decreasing by 48%.

- Family Medicine Residency programs offered 18% fewer positions through the NRMP and have filled less than half of matched positions with US graduates since beginning a downward trend from 57% in 2000 to a nadir of 40.5% in 2005.

- Combined Medicine-Pediatrics Programs have seen a decline in number of programs since 2000 from 103 to 79, with a corresponding decrease in positions offered through the NRMP from 446 to 354.

- General Pediatrics has remained the most stable in terms of popularity among US senior medical students over the last decade, with a small increase in the number of positions over the past decade despite a drop in popularity among US senior medical students, dropping from a match rate of 76.4% in 200 to a nadir of 67.6% in 2008.

Despite these grim statistics, more recent trends suggest an increase in medical student interest in primary care fields. In 2010, Family Medicine saw an increase in applicant numbers, filling more than 44% of an increased number of positions offered in the NRMP. Combined Medicine-Pediatrics programs saw a considerable increase in popularity among US senior medical students as well, filling 83% of a stable number of positions. Although these trends towards improvement are small, they represent an upward trend in medical student interest since what appears to be a nadir during the 2005-2007 academic years.

Career choices within some primary care disciplines have changed dramatically over the past decade. Among recently surveyed PGY-3 **US Medical Graduates** (**USMG**) in Internal Medicine training programs, 22.8% planned to enter **general internal medicine** (**GIM**) while 60.4% planned a subspecialty career. In contrast, PGY-3 **International Medical Graduates** (**IMGs**) were more likely to choose GIM.[2] According to the American Board of Internal Medicine Workforce data, there were 4340 first year subspecialty fellows in academic year 2008-2009, compared with 3298 in 1999-2000, an increase of 32%.[3] In contrast, a recent survey of 279 categorical medicine residents, 44% were considering a hospital medicine career.[4]

While students entering internal medicine residency programs may have increased, fewer of those students eventually choose careers in primary care. There has been a steady decline in the percentage of internal medicine residents planning to pursue generalist careers. In 1998, 54% of PGY-3s planned to practice general internal medicine compared with 27% in 2003. Ominously, in 2003, only 19% of PGY-1s surveyed nationally planned to pursue careers in general medicine.[5] Lifestyle and income have been found to increasingly influence medical students' career choices away from primary care disciplines.[6]

The face of residency education, especially in Internal Medicine, has changed dramatically over the past decade with respect to resident exposure to primary care role models and mentors, many of whom have left the inpatient care of patients in favor of a more focused office-based clinical career. In one recent study 54% of teaching hospitals employed hospitalists before implementation of resident work-hour limitations, while 73% did so afterwards.[7] Specific teaching activities of hospitalists included: attending on teaching service (92%) and conducting rounds (81%). Lack of exposure to generalists results in less consideration of that career option by residents.

The curriculum and assessment of residency training is regulated through the **Accreditation Council for Graduate Medical Education** (**ACGME**), which accredits the majority of allopathic training programs in the USA. Since 2003, the ACGME has developed rules limiting Duty Hours for residents in all disciplines of medicine. Self-reported weekly hours worked by residents before 2003 averaged 65.7 before dropping to 59.3 upon implementation of resident duty hour restriction in 2003.[8] Since that time, all residents are required to adhere to four principal duty hour rules:

- Maximum 80 hours worked per week averaged over four weeks

- Maximum 30 hours on duty in a continuous manner

- Minimum of one day completely free of duty responsibility in seven, averaged over four weeks

- Minimum of ten hours free of all duties between assignments.

These rules were implemented in an effort to improve patient safety, as well as to improve resident safety and education. Many training programs complied with these new rules through an assortment of scheduling adaptations, including the use of "night float" teams and other systems of coverage in which patient care responsibilities were transferred to another group of physicians. Most programs have adapted and explored ways to meet the requirements while preserving the educational experiences of residency.

In September 2010, seven years after the first duty hour rules were applied, additional rules were developed to go into effect July 1, 2011. These new rules are detailed elsewhere in this issue. From the primary care residency perspective, the greatest change will be the new limits to continuous on-duty periods, effectively end-

ing the tradition of the long overnight hours "on-call" for interns. The entering class of interns on July 1, 2011 will not encounter the long sleepless hours on duty known by prior interns but will be required to remain attentive to patient details despite more interrupted schedules of bedside availability.

Primary care training has weathered the past decade, operating now in a much different training environment than that which existed at the turn of the millennium. A new focus on primary care has emerged in the current national landscape, brought about by a growing concern about limited access to care by many individuals, a growing interest in the "Patient Centered Medical Home" concept as a more effective healthcare delivery model, and the new Health Care Reform Act, with both broad-reaching implications for providers and patients alike.

The Present

Perhaps the most recent and compelling attempt to refocus national attention on primary care objectives is highlighted in a recent jointly signed statement of primary care professional organizations. The American Association of Family Physicians, American Academy of Pediatrics, American College of Physicians, and American Osteopathic Association created and endorsed the "Joint Principles of the Patient-Centered Medical Home" in March, 2007.[9] A brief summary of the principles promulgate the belief that primary care practice should be guided by a "personal physician" whose treatment is coordinated and integrated with partner health care team members, yet maintains a whole person orientation to each patient as an individual. The signatory organizations also advocate enhanced value and reimbursement to primary care practitioners tied to measures of care quality, safety, and enhanced access for their patients. Primary care practitioners are already increasingly involved in the management of chronic care concerns in which there is no expectation of cure, but rather close supervision of maintenance of behaviors. Residency training must support these ideals and the skills to enable graduates to practice them with competence.

Ever fewer graduating medical students consider a career in primary care practice. A substantial number of those that enter primary care residency ultimately move on to subspecialty fellowship and career pathways. The root cause of primary care avoidance is most certainly multifactorial. One major contributor is misaligned incentives. The median debt burden of the medical student graduating in 2009 is up to $160,000.[10] On the flipside, the primary care salary support is the lowest of virtually all physician-based careers. While the salaries of primary physicians are quite handsome in comparison to the median salary of most American workers, the primary care practitioner may well give up tens of millions of dollars of potential earned income across a career of 30 to 35 years when viewed side by side with an alternative career in subspecialty or procedural practice.

Ever fewer graduating medical students consider a career in primary care practice.

From a clinical service vantage point, some residency programs may further reduce the number of patients cared for by their residents in order to address the duty hour and other workload limits in effect. The consequences of such duty hour regulation are not well-studied and will require that program directors decide how best to accomplish adequate patient-centered education. While each program will create an individualized solution, program directors and hospital administrators may choose to schedule trainees for a greater preponderance of nighttime and weekend shifts, reduce patient census on teaching services, or increasing the number of resident and/or non-resident providers.

Oversight of residency education practices with respect to duty hours has been accompanied by new requirements for supervision and documentation of competency in various skills and knowledge relevant to the field. The competency-based approach to graduate medical education shifts the focus away from an accounting of educational events (conferences teaching electrocardiogram interpretation, for example) to a documentation of acquired ability (can a particular resident interpret electrocardiograms?). This approach, while educationally sound, carries with it a challenge of both measurement and documentation, both of which have grown in scope over the past decade. The Pediatrics Companion Document is an example of this new emphasis on documenting the educational process throughout residency.[11] These recently published guidelines define the expectation that each resident completes and documents activities in the following tasks:

- Self assessment and written reflection
- Individualized learning plan
- Quality improvement
- Documentation of patient and procedure logs
- Proficiency in evidence based analysis

In turn, Residency directors must document competence through ongoing written multi-source feedback and direct observation of each trainee including

- Professional behaviors and interpersonal skills
- Communication with patients and health care associates
- Aptitude in patient handoffs and patient safety
- Clinical capacity through direct observation from physicians, hospital staff, and patients

On the horizon is a novel progressive program which tracks trainees as they advance in skill across a comprehensive series of developmental tasks and markers referred to as "Milestones."[12,13] Each one of these concepts holds sound educational merit and great promise for assuring competence in a uniform manner so that residency leaders may assure their trainees and the public that residents have, upon graduation, acquired the necessary skills for practice. Medical educators have raised concerns, however, that in an era where resident duty hours are capped at a maximum level, such extensive monitoring and documentation requirements may lead to a redirection of resident time away

from the bedside and learning the course of the disease process in the context of relationship-driven care.

The Future

Epochs of change are also arenas for opportunity and improvement. The challenge is ours to embrace as we design the future place of primary care practice for the country.

One possibility is that primary care practice will no longer be a physician dominated field. Contraction of resident work hours coinciding with free market forces create a growing demand for mid-level practitioners who can support extended primary care activity at diminished cost. Perhaps this frame shift is for the best. The model of a primary care medical home with a lead physician supervising a team of experts providing service in mental health, diabetes, behavior, lifestyle, etc. may in fact be the most effective and cost-efficient method of enhancing the health of our population at large.

An alternative model gaining national traction is known as the Accountable Care Organization, an alliance of physicians and hospitals whose financial incentives arise from enhancing health care quality while holding down overall costs. In principle, accountable health care organizations would share the financial risk in medical utilization with the potential to gain vast financial reward for maintaining and improving patient health rather than profiting through greater use.

If our goal as a nation is to enhance the physical and emotional well being of our population while diminishing overall health expenses, there should be movement toward support of the patient-centered medical home. High quality care in tandem with high cost savings should be rewarded by appropriately high reimbursement rates for those groups that effectively support the foundation of quality and affordable health care in the United States. As the nation moves toward a belief that high quality yet controlled health care is worth more than abundant, market-allocated health care, primary care physicians will naturally find their way back to positions of respect, reimbursement, and reward. Residency education will provide a valuable opportunity for trainees to work with primary care role models and mentors.

Recently, the resumption of funding federal grants to promote primary care training, especially in currently underserved areas, bodes well for the support of such career paths. Title VII of the Health Care Health Professions Education Assistance Act had been the single pillar of support to incent education of primary care practitioners. Title VII efforts stimulated a resurgence of individuals entering primary care research and practice. Funding was virtually eliminated in the early part of the 21st century, negatively impacting educational opportunity and support of primary care training programs. Fortunately, there has been an increase in funding at the federal level in fiscal year 2010, with optimism for greater support in 2011.

Residency education in primary care continues to face challenges in the current medical education environment. Some of those challenges such as reimbursement are unique to primary care disciplines while others are shared across programs. Because the influence of role models for primary care has been shown to be an important predictor of pursuit of career in primary care, cultivating innovative programs and strong mentoring relationships to sustain interest among trainees in primary care are critical. The challenge for graduate medical education is to continue to provide high quality experiences for a growing number of medical school graduates, while recognizing the important role played by primary care in the health of the country and in the career paths of our graduates.

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Financing of Graduate Medical Education

Kay Wagner, MBA, and Staci A. Fischer, MD

The road to become a practicing physician is an expensive endeavor for everyone. Undergraduate allopathic medical education leaves the average medical student in debt over $150,000.[1] Graduate medical education, necessary for physician licensure and board certification, is very costly. In academic year 2009-2010, the ACGME reported there were approximately 111,000 residents and fellows in ACGME-approved programs nationwide.[2] Current salaries for those trainees range from approximately $44,000 – $70,000 depending on postgraduate level and region.[3] The cost of training residents and fellows is considerably higher than their salaries suggest; fringe benefits, malpractice coverage, teaching and administrative costs, support services, library and electronic medical literature resources, call rooms, etc, must be provided as well. In 2009, it is estimated that federal and state financial support for GME exceeded $12 billion.[4]

Since the mid-1960s, Medicare has been the largest source of federal funding for graduate medical education. Prior to the creation of Medicare and Medicaid, hospitals funded individual resident and fellow training. The costs were relatively low; for example, prior to 1952 interns at RIH did not receive any remuneration, and fifth year residents received a stipend of $1,320 per year, and were housed on campus, providing care more than the current 80 hours per week limit. Residents were vital to the care of patients and therefore the financial stability of the hospital. Resident stipends at RIH steadily increased to $4,300 and $6,600, for PG-1s and PG-5s, respectively in 1966. With the enactment of the Medicare and Medicaid public insurance programs, however, came a greater demand for physician services. Medicare assumed partial responsibility for supporting **graduate medical education (GME)** as an incentive for hospitals to create more residency training positions, in part to keep up with the demand for services. In addition, providing educational opportunities for resident and attending physicians at teaching hospitals improved patient care, benefitting Medicare beneficiaries.[5–7] Until the mid-1980s reimbursement was cost-based, and determined by each teaching hospital's calculation of "reasonable GME costs." Hospitals would submit reports to Medicare on the costs of providing training, and Medicare would reimburse each hospital accordingly.

In 1985, with the passage of the Consolidated Omnibus Budget Reconciliation Act, Medicare established two types of prospective payments for GME in tandem with the establishment of DRG's: **Direct Medical Education (DME)** and **Indirect Medical Education (IME)** Adjustments. DME payments were allocated to cover resident salary and fringe benefits, operating expenses and supervising physician costs. The total DME payment that a particular hospital received was calculated based on three factors: 1) a hospital-specific **Per Resident cost Amount (PRA)** based on FY1984 cost report data (which included resident salaries and fringe benefits, supervising physician, administrative and clerical costs); 2) the number of resident FTE's at the hospital and 3) the proportion of Medicare patient-days at the particular hospital relative to total patient-days.

IME adjustment payments were intended to cover additional costs borne by teaching hospitals to provide postgraduate training which were not directly tied to training programs, to account for the increased use of tests and ancillary services, the greater acuity of illness of patients cared for at teaching hospitals, and other inefficiencies associated with teaching hospitals. IME payments are made as a percentage an add-on to a hospital's **diagnosis related group (DRG)** payment rate for Medicare discharges. They are based on the IME adjustment factor, which is calculated using a hospital's ratio of residents to beds and an IME multiplier, which is set by Congress. Thus, the total IME payment that a hospital receives is dependent upon the number of residents the hospital trains, the number of Medicare discharges, and the current level of the IME multiplier. For the first several years of the prospective payment system, Medicare provided DME and IME payments to hospitals for each resident/fellow FTE employed at the hospital based on the Medicare Cost Report submitted by the institution. If the number of residents employed increased, so did the reimbursement. Not surprisingly, residency positions continued to increase at hospitals over the decade.

During the same timeframe, but without changing the basic reimbursement model, Medicare made a number of changes to try to control costs. For example, Medicare reduced the IME multiplier, and in an effort to balance primary care versus specialty training, Medicare reduced DME payments for most fellowship positions to half the reimbursement of residency positions. This discrepancy in payment for fellowship positions versus residency positions remains in effect.

Despite these efforts, expenditures continued to increase, and in 1997, Congress passed the Balanced Budget Act, which included sweeping changes in the Medicare reimbursement program for GME.[8] The major provisions that affected reimbursement to hospitals included:

1) Establishment of a "cap" for each hospital, a maximum number of resident FTE's, for which DME and IME payments would be made, based on FTE numbers reported on that hospital's 1996 Medicare Cost Report.

2) The IME multiplier was decreased from 7.7 percent per 0.1 **intern/resident-to-bed (IRB)** ratio in FY 1997 to 5.5 percent in FY 2001 and subsequent years.

3) A cap on the FTE's used in the IRB ratio which is used in calculating the Medicare IME payment.

4) Medicare initiated IME payments to hospitals, in addition to DME payments previously received, for the time residents train at non-hospital ambulatory sites. However, the hospital had to incur

most or all of the training costs at that site, including faculty salaries. Hospitals could not contend that physicians in non-hospital sites volunteered their time.

These limits appear to have curtailed growth in resident positions for the first five years after implementation. From 1997 to 2002, there was only a 0.1% increase in the number of US residents and fellows in ACGME programs according to the AAMC National GME Census. In the subsequent five years, there was a 7.9% increase in the number of trainees.[9] Some of that growth is due to the trend of increasing fellowship training after residency rather than an absolute increase in the number of medical school graduates in residency training. It has also been posited that duty hours changes in 2003 may have influenced the growth in resident FTE's despite cap limits and declining IME payments.

Over the past decade, debate has continued over how to support graduate medical education adequately and reliably. Resistance to change and the tension between service and education inherent in GME activities has contributed to a lack of reform. Various groups have advocated for a number of different models for supporting GME from developing an all payer system (where all insurance providers would contribute to supporting residency and fellowship programs) to modifying current Medicare regulations to more accurately reflect the actual costs of providing training.[6,7,10] The **Council on Graduate Medical Education** (**COGME**), an advisory group authorized by Congress in 1986, is charged with providing ongoing assessment of physician training and workforce issues, including finance policies. In 2007, COGME called for increased flexibility in graduate medical education, with several broad recommendations :[11]

1) Align GME with future healthcare needs by increasing funded GME positions by a minimum of 15%, directing support to innovative training models which address community needs and which reflect emerging, evolving and contemporary models of healthcare delivery.

Resistance to change and the tension between service and education inherent in GME activities has contributed to a lack of reform.

2) Broaden the definition of "training venue" beyond traditional training sites (e.g., hospitals) by decentralizing training sites and allowing for new training venues while enhancing the quality of training for residents, and revising current CMS rules that restrict the application of Medical GME funds to limited sites of care.

3) Fund innovative GME projects with the goal of preparing the next generation of physicians to achieve identified quality and patient safety outcomes by promoting training venues that follow the Institute of Medicine's (IOM) model of care delivery

4) Assess and rewrite statutes and regulations that constrain flexible GME policies to respond to emergency situations and situations involving institution and program closure.

5) Develop mechanisms by which local, regional or national groups can determine workforce needs, assign accountability, allocate funding, and develop innovative models of training which meet the needs of the community and of trainees, in order to make accountability for the public's health the driving for GME. Continued funding of GME to institutions should be linked to meeting predetermined performance goals.

The most recent health care reform legislation, the **Patient Protection and Affordable Care Act** (**PPACA**) signed into law in the spring of 2010, calls for changes in many aspects of health care, including graduate medical education.[12] Although the total number of Medicare-funded positions was not increased (as recommended by COGME and a number of other GME leadership groups), approximately 900 unused residency FTE's will be redistributed with a goal of increasing residency positions in primary care specialties and general surgery. Hospitals in states in the lowest quartile of resident-to-population ratio, those in states with the highest percentage of population living in a **health professional shortage area** (**HPSA**) and rural hospitals will be given priority, so that it is unlikely that hospitals in Rhode Island will be able to gain any positions. The legislation also allows for the redistribution of slots from closed hospitals to be allocated permanently to other hospitals, preferentially in the same geographic area.

CMS has also revised definitions for reimbursable time in several areas to allow sponsoring hospitals to count training activities that take place in non-hospital sites. The sponsoring institution need only incur the costs of the residents' salary and fringe benefits, eliminating the requirement for covering faculty salaries. In addition, didactic time in both hospital and non-hospital sites is now allowable (previously, only time spent in the hospital or clinic caring for patients was reimbursable). This change in the regulations will particularly benefit those hospitals that are under their cap. The PPACA also provides funds for establishing teaching health centers to train primary care physicians, and allows for training grants to develop and/or expand primary care residency programs. And finally, there are proposals (based on COGME recommendations) to tie a portion of IME reimbursement to performance-based measures. Payments would be linked to documentation that residents are being trained appropriately in a variety of settings and systems for future practice, and are receiving training in care coordination, the cost and value of diagnostic and treatment options, interprofessional and multi-disciplinary teams, identification of system errors and solutions, and the use of health information technology. The ACGME already requires programs to provide these types of training experiences, however, documentation

requirements may become more rigorous in order for programs and hospitals to qualify for this type of reimbursement from Medicare.

How the PPACA will ultimately impact the financing of GME is yet to be seen. A primary concern, resident caps, has not been addressed. And while provisions in the legislation may begin to address other issues related to financing graduate medical education, there is still no consensus on how to appropriately support GME in order to ensure sufficient workforce of highly qualified physicians to care for the patient care needs of the country.

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The ACGME Core Competencies: Changing the Way We Educate and Evaluate Residents

Martha B. Mainiero, MD, and Ana P. Lourenco, MD

The ACGME Outcomes Project

While duty hour restrictions have garnered the most attention in discussions of graduate medical education, there is an elemental shift occurring in resident and fellow education that goes hand in hand with restrictions on duty hours and tightening of supervision requirements. Resident training is morphing from apprentice-style on-the-job training into a more formal educational process, along with all the pros and cons that transition entails. The **Accreditation Council for Graduate Medical Education** (ACGME) has defined six core competencies that all physicians need to practice in a changing health care environment, and all accredited training programs are now based upon these competencies.[1] Despite the fact that teaching and evaluation of these competencies is required, many physicians and medical students are still not familiar with these competencies.[2, 3] This article describes the rationale behind the changes, the educational concepts that now form the framework for residency and fellowship training, and the challenges and opportunities of training physicians within this framework.

The ACGME, before instituting the first duty hour restrictions in 2003, approved a long term initiative called the "Outcomes Project" in 1999.[1] The purpose of this initiative has been to increase the emphasis on educational outcomes in residency education. In other words, in the "old days" of the 20th century, the ACGME accredited residency programs based upon their potential to train residents. The type and volume of cases, facilities and credentials of the staff were evaluated but resident achievement was not actually measured. It was more or less assumed that if you had good patient material and good teachers, then resident training should be adequate and the result would be a competent physician. This apprentice model allowed the training program a great deal of autonomy and worked for a very long time. So what was the impetus for change? Probably the same thing that has led to duty hour restrictions: the need for public accountability. Because our system of graduate medical education relies heavily on public funding, the ACGME strives to assure the public that the accreditation process includes safeguards to protect the public from tired, poorly supervised and, most important, poorly trained residents.

The Core Competencies

Since the turn of the century, the ACGME has shifted its focus from assessing program potential to assessing whether residents actually achieve desired learning objectives. This shift has been a slow, ongoing process that continues to evolve as educational goals are defined and evaluation methods are introduced. The first part of this project was identification of learning objectives on the basis of 6 core competencies physicians need to practice in a changing health care environment. These core competencies are:

- Medical Knowledge
- Patient Care
- Practice-based Learning and Improvement
- Professionalism
- Interpersonal and Communication skills
- Systems-based Practice

The second phase of the project, completed in 2006, requires programs to develop tools to assess these competencies. In the current phase, which extends until 2011, programs must use the data from competency-based outcome measures to improve the training program. Each specialty has its own **residency review committee** (**RRC**) within the ACGME that is responsible for creating the requirements specific to that specialty, and each RRC has been charged with determining which outcome measures must be used to measure each core competency for that specialty. In other words, the RRC for radiology is currently determining what bench marks a radiology resident must achieve in order to be considered "competent" in each core competency. A specific example might be that a resident will be considered competent in medical knowledge if he or she scores above a certain percentile on the in-service exam and may be considered competent in interpersonal and communication skills if he or she is ranked as competent in these skills on a 360 degree evaluation by multiple evaluators. Once these milestones have been determined, each program will need to submit periodic reports to the ACGME detailing the percentage of residents that have achieved competence in these areas. Programs must then use these outcome measures to improve the educational program.

There has been criticism that the ACGME competencies are contrived, force residents into too much of a student rather than physician role, and take time away from the actual practice of physician training.[4] In addition, there is no evidence that current measurement tools exist to measure the competencies individually.[5] However, the Outcomes Project is clearly here to stay and requires those involved with resident and fellow education to accept these standards as necessary parts of training.[6] With that in mind, what follows is a brief discussion of some of the competencies that are the most problematic either because they are difficult to understand or because they are difficult to measure.

Despite being in existence for over ten years, the concepts of "practice-based learning and improvement" and "systems-based practice" are particularly poorly understood. This makes it challenging to devise and implement teaching and evaluation methods for these competencies. In addition, there is some overlap between these two competencies which increases the confusion, although the overlap may simplify the education and evaluation of these competencies once they are understood.

Practice-based Learning and Improvement

Practice-based learning and improvement (PBLI) aims to teach trainees how to become lifelong learners in the rapidly changing world of clinical medicine. The requirement common to all accredited residency and fellowship programs is that "residents must demonstrate the ability to investigate and evaluate their care of patients, to appraise and assimilate scientific evidence, and to continuously improve patient care based on constant self-evaluation and life-long learning. Residents are expected to develop skills and habits to be able to meet the following goals:

- Identify strengths, deficiencies, and limits in one's knowledge and expertise
- Set learning and improvement goals
- Identify and perform appropriate learning activities
- Systematically analyze practice using quality improvement methods, and implement changes with the goal of practice improvement
- Incorporate formative evaluation feedback into daily practice
- Locate, appraise and assimilate evidence from scientific studies related to their patients' health problems
- Use information technology to optimize learning
- Participate in the education of patients, families, students, residents and other health professionals"[7]

The model of practice-based learning is not a new one, and is utilized at the medical school level as well. Essentially, the model is one in which a physician is faced with a question or problem in the course of daily practice, to which he/she does not know the answer. The physician should identify this lack of knowledge, search the scientific literature for an answer, and use that knowledge to improve patient care. (Figure 1) Teaching of practice-based learning should thus include education about searching the medical literature as well as critically evaluating studies for scientific merit and applicability to the particular question raised in the course of clinical practice. Some academic centers have forged a productive alliance between health sciences librarians and **graduate medical education (GME)**, creating effective online teaching modules that focus not only on the nuts and bolts of performing a search of the medical literature, but also on how to critically evaluate the studies and practice Evidence Based Medicine.[8] Other academic centers have incorporated PBLI learning by analyzing complex clinical decision making in clinical scenarios taken from the resident's first hand experience.[9] This resident-centered, "ground-up" approach has led to the requirement that residents develop individual learning plans to demonstrate that they recognize and can find the resources to address their specific weaknesses.

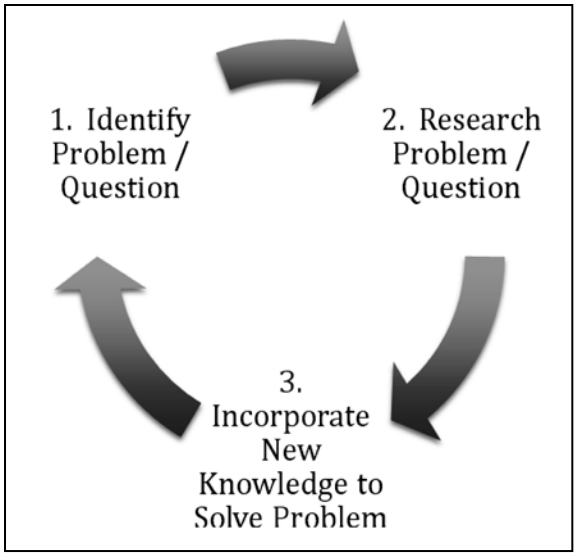

Figure 1.

Another important part of PBLI is learning how to systematically use quality improvement methods to implement changes that improve practice. This means that residents must have meaningful involvement in their departments' **quality initiatives (QI)**. In addition to attending morbidity and mortality conferences, residents must be active participants in those quality improvement initiatives that can be measured to demonstrate practice improvement. Few methods to evaluate the success of initiatives to teach practice-based learning have been reported but range from pre- and post-intervention surveys of the residents to use of an **Objective Structured Clinical Examination (OSCE)**.[10-11]

There is some overlap between the PBLI and SBP competencies, as both involve improving practice within the health care system. Often, centers report curricula and evaluation methods that address overlapping portions of PBLI and SBP together.[10-11]

Systems-based Practice

The **systems-based practice (SBP)** core competency encompasses the non-medical aspects of medical care and focuses on the residents' ability to work competently within the healthcare system. The ACGME requires that "Residents must demonstrate an awareness of and responsiveness to the larger context and system of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care. Residents are expected to:

- Work effectively in various health care delivery settings and systems relevant to their clinical specialty
- Coordinate patient care within the health care system relevant to their clinical specialty
- Incorporate considerations of cost awareness and risk-benefit analysis in patient and/or population-based care as appropriate
- Advocate for quality patient care and optimal patient care systems
- Work in interprofessional teams to enhance patient safety and improve patient care quality
- Participate in identifying system errors and implementing potential system solutions"[7]

These skills were not formally taught in the traditional apprentice style model of residency education, and many SBP skills were typically learned "on the job" upon finishing residency. Examples include learning about participation with health insurance plans, healthcare delivery in a variety of venues (in-hospital vs. in-office, private practice vs. academic setting), coordinating patient care across a multi-specialty healthcare system, and considering cost to patients and the healthcare system in the decision-making process. For radiologists, for example, cost-effective practice means that it is important to know which imaging test is most likely to effectively answer the clinical question posed by a referring physician. Proper selection of an imaging test will often preclude the need for additional studies and result in overall savings to the patient and healthcare system. Therefore, for radiology residents, knowledge and utilization of the American College of Radiology Appropriateness Criteria for cost-effective imaging utilization can be one outcome measure used to demonstrate competence in SBP.[12] The precise SBP practice goals and objectives for residents will vary by specialty, but an understanding of the health care delivery system and the ability to work in teams to improve patient care quality is common to all. Medical simulation has been shown to be a useful tool in teaching teamwork, as well as for evaluation of multiple competencies.[13, 14]

In summary, resident education remains a dynamic and challenging process, with increasing regulations and requirements for both administrators and trainees. It is, however, a critically important endeavor to which we must remain committed. Knowledge of the underlying reasons for the requirements and an understanding of best practices in residency education to meet those requirements can further the goal of producing physicians who are competent in all facets of practice within our increasingly complex health care delivery system.

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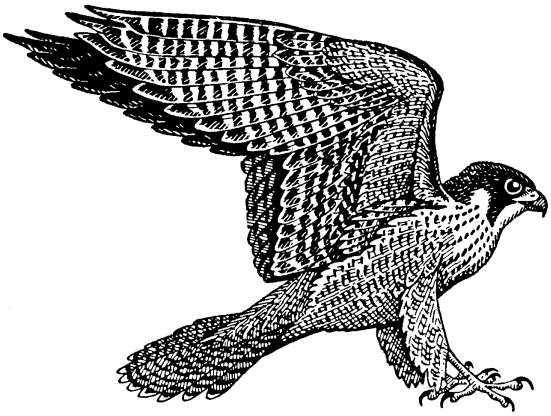

New ACGME Rules for Supervision and Duty Hours: Resident Commentary

Brian C. Drolet, MD, Lucy B. Spalluto, MD, Matthew Zuckerman, MD, and Matthew McDonnell, MD

The recently approved Accreditation Council for Graduate Medical Education (ACGME) Common Program Requirements including new Standards for Resident Supervision and Duty Hours will take effect July, 2011.[1] These new requirements revise the initial regulations implemented by the ACGME in 2003 and respond in part to recommendations set forth by the **Institute of Medicine (IOM)** in 2008.[2-4] The changes are proposed to ensure three main objectives: patient safety and quality of care in teaching hospitals, patient safety and quality of care provided by current residents in their future independent practice, and maintenance of a "safe and humanistic educational environment" for residents to learn.[5]

As residents, we applaud the ACGME's continued efforts to promote resident education, monitor resident workload, and ensure patient safety. These new standards have drawn attention from both the public media and medical professionals. Yet, despite very admirable goals, the actual impact of many of the changes has been questioned by residents and faculty alike. Our purpose is to summarize the 2011 ACGME Common Program Requirements for resident supervision and resident duty hours and discuss how we believe they may impact resident education and quality of life.

The new Common Program Requirements cover 15 headings: (1) Supervision; (2) Clinical Responsibilities; (3) Teamwork; (4) Professionalism, Personal Responsibility, and Patient Safety; (5) Transitions of Care; (6) Alertness Management; (7) Maximum Hours of Work Per Week; (8) Maximum Duty Period Length; (9) Maximum In-Hospital On-Call Frequency; (10) Minimum Time Off between Scheduled Duty Periods; (11) Maximum Frequency of In-Hospital Night Duty; (12) Mandatory Time Off Duty; (13) Moonlighting; (14) Duty-hour exceptions; (15) Home Call.

To simplify the proposal we have created a framework for these changes within four headings: Supervision, Duty Hours, Call, and Other. We have chosen to narrow our discussion to the changes we believe will have the most impact on residents: supervision, duty hours, and call.

Supervision

Increasing supervision and faculty teaching time is important for improving resident education. Both anecdotally and empirically, patients are safer when residents receive an appropriate level of supervision.[6-8] However, we have concern regarding the proposal to change the oversight of PGY-1 residents such that supervision must be immediately available at all times. We feel this level of supervision is not warranted in every setting or throughout the entirety of the intern year.

A PGY-1 resident in the first few months of residency clearly requires greater supervision, and in most cases, should have a more senior resident or attending immediately available at all times. However, in order to insure that residents in the first year of training develop the skills necessary to supervise others on July 1, consideration should be given to "graded and progressive responsibility"[1] for residents over that critical first year of postgraduate training. Sheltering, the PGY-1 resident for an entire year risks creating a less independent, less well trained PGY-2. How can a PGY-2 resident be expected to provide supervision to PGY-1 residents if he or she is unprepared to act independently by the end of the intern year?

Consideration should be given to a more graded level of supervision, with immediately available supervision for the early months of the PGY-1 year followed by more indirect supervision (i.e., the supervising physician is available by phone and able to come within a reasonable time period if needed). Ideally, the level of necessary supervision would be left to the discretion of the Program Director, based on an individual resident's performance and achievement of core competencies. Similar decisions are already made by Program Directors in determining when a resident is able to perform a certain procedure independently.

Duty Hours

Maximum Hours of Work per Week and Duty Hour Exceptions:

No changes have been made in these areas. Residents remain limited to an 80-hour work week, averaged over four weeks. Including external and internal moonlighting hours within the 80 hour work limit is unlikely to make a significant impact on many residents.

Mandatory Time Free of Duty:

The new Requirements maintain the rule that all residents must have one day off in seven, averaged over a four-week period. The 2008 IOM recommendations included a mandatory five days off per month with one 48-hour consecutive time period off per month. We feel this would be a major positive change for resident quality of life and would recommend that this change be considered in future revisions.

Maximum Duty Period Length:

The new requirements will limit the maximum shift length of PGY-1 residents to 16 hours. This is the most dramatic of the proposed changes and will likely cause the most impact on residents and training programs alike. A shorter PGY-1 shift length marginalizes the educational experience of interns as well as the interns' direct involvement in and impact upon patient care. A duty period limited to this length opposes the concept of the 'resident' physician as it negates any true in-house call for interns. Interns will no longer experience and learn from a 24-hour call period when they can follow the course of a patient's exam and the evolution of illness. Additionally, they will be less well prepared to function in more senior roles when they are required to take longer call periods and supervise the work of others without a transitional period.

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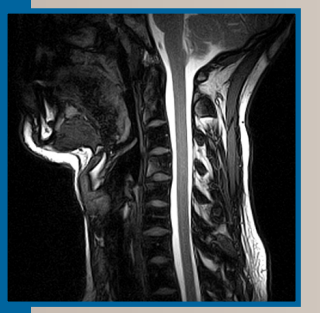

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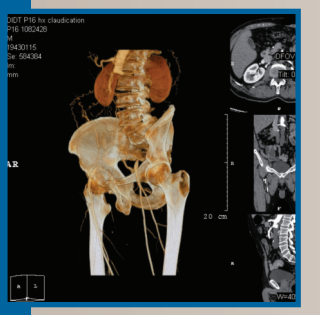

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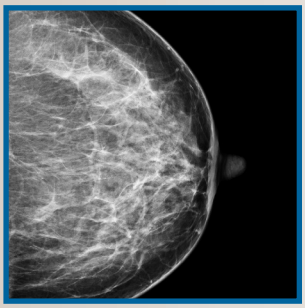

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This regulation will allow the intern less continuity of patient care than third or fourth year medical students. Medical student call hours remain unregulated in order to prepare senior medical students for the responsibilities of residency. Additionally, this change merely defers a greater call burden to the more senior residents. Junior level responsibilities will be transferred to more senior residents as interns are taken out of the call schedule, negatively impacting both education and quality of life for the more senior residents. This change is in direct opposition to two of the fundamental goals of the proposed changes.

Admittedly, the first overnight call nights as an intern are exhausting and intimidating, but these are not experiences that should be shifted to the second year of residency. In addition to adjusting to the intellectual and emotional challenges of residency, interns should be exposed to the rigors of a physician lifestyle where they must be aware of their fatigue and able to utilize strategic napping. To defer this opportunity for personal growth to the second year only takes away from the learning experience of the intern year. Additionally, shifting programs to a night float schedule to accommodate the PGY-1 limits will limit attendance at daily lecture series and conferences for residents in all levels.

The change of post-call transitional periods (to four hours from six hours) will not likely have a significant impact on patient care. However, the proposal to no longer allow residents to participate in clinic or didactic sessions after a 24 hour work period may significantly limit the amount of time residents are able to commit to a continuity clinic or educational sessions. As clinics are a fixed requirement in most specialties and gaining knowledge of management of patients in the ambulatory setting is a goal of nearly all training programs, this schedule change will further complicate the complex schedules in existence to insure that residents meet all requirements within the training period.

Minimum Time Off Between Scheduled Duty Periods:

The new regulations require a minimum of eight hours between duty periods, with a recommended ten hours of rest. Additionally, 14 hours free of duty are required following 24 hour in-house call. The 2003 restrictions stated that residents *should* have ten hours between duty periods, with no discussion of time off following prolonged in-house call periods. This is a positive change. This more strictly enforced time off is crucial for residents to be well rested.

Call

Maximum In-Hospital On-Call Frequency:

The final version of the ACGME 2011 Common Program Requirements again regulates the maximum in-hospital on-call frequency to no more than every third night and continues to allow averaging over a four week time period. The proposal originally submitted by the ACGME suggested no longer allowing averaging. We commend the decision to continue to allow residents this flexibility in scheduling.

At-Home Call:

Home call remains minimally regulated by the ACGME. Although many subspecialty residencies and fellowships rely on home call to function, it has the potential to negatively affect patient safety and resident quality of life. Home call residents are, by default, less readily available to see new or established patients in the middle of the night. Furthermore, home call schedules are sometimes as frequent as six days in a week. Even if the resident is not actually called into the hospital, being awoken frequently to answer calls and simply knowing the potential to be called into the hospital exists, prevents a restful out-of-hospital experience. These situations have not yet been addressed by the ACGME.

Maximum Frequency of In-House Night Float:

The new Program Requirements limit in-house night float to a six night maximum. There is currently no limitation on the maximum number of in-house night float shifts. Limiting in-house night float to a six night maximum has the potential to make scheduling difficult for programs who are currently using one week (seven night) blocks for their night float system. This limitation may require some programs to utilize an additional resident from the day shift to cover the seventh night.

Conclusions

The ACGME's new common program requirements were designed to improve patient safety, resident education and quality of life. The changes will take effect in July 2011.

In order to optimize patient safety, we must find a way to balance continuity of patient care with management of resident fatigue. Despite evidence showing an increase in medical errors with fatigue, definitive improvements in quality of care and patient safety have not been demonstrated following implementation of the 2003 duty hour regulations, which limited residents to 80 hours per week.[9-11] The new changes will increase the frequency of "handoffs, " despite evidence connecting medical errors with more frequent transitions of care.[12] The reality is that there are few data on the impact of existing regulations on the quality or safety of care provided to patients in teaching hospitals. The possibility that residency training will need to be lengthened in order to insure competency for graduates is a concern to many resident groups.[13]

A recent survey of more than 2500 residents in allopathic residency programs throughout the US demonstrated concern as to the implications of the changes on the duration and quality of residency training.[14]

The ACGME should monitor the impact of the 2011 revisions to ensure that their adoption is backed by solid academic research demonstrating improved patient safety and resident lifestyle, without compromising the quality of residency training in the US. The impact of all duties in residency training—including at-home call responsibilities—should be monitored and reassessed with outcomes measurements related to the changes in duty hours and supervision.

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Disclosure of Financial Interests

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Seebert Goldowsky, MD, Memorial Lecture: April 12, 2011 – Remembrance of a Past Internship

Stanley M. Aronson, MD

My assignment this morning is to bring you back in time—if only momentarily—so that you may experience the ambience of medicine some 65 years ago: To feel "the way it was" in 1946.

Why this exercise in nostalgia (1946 being, incidentally, my first year of internship)? It is to reinforce the notion that our profession, despite its nobility, requires relentless re-examination and earnest re-appraisal in order to grow, to re-affirm its purpose; and self-examination recognizes how little we, as a profession, had been capable of accomplishing until recent years. A clergyman or lawyer educated, say, in the first decade of the 19th Century, might succeed admirably at today's pulpit or before today's bars of justice. A physician-colleague of theirs also trained in, say, 1810, would be hopelessly lost in today's medical arena.

Let me share with you three older commentaries to emphasize how poorly our profession had been viewed until recent years:

> **Thomas Jefferson**: "Whenever I see an assemblage of three or more physicians, I look up to the skies to seek the gathering of vultures."
>
> **Oliver Wendell Holmes**: "I firmly believe that if the whole materia medica could be sunk to the bottom of the sea, it would be all the better for humanity and all the worse for the fishes."
>
> **Lawrence Henderson**: "Somewhere between 1910 and 1912 in this country, a random patient with a random disease consulting a licensed physician chosen at random, had, for the first time in the history of mankind a better than fifty-fifty chance of profiting from the encounter."

A bit hyperbolic perhaps, but those pivotal years mentioned by Henderson were not randomly selected. 1910 witnessed the publication of the Flexner Report on Medical Education underwritten by the Carnegie Foundation. Using the model of the recently established Johns Hopkins Medical School the Report condemned virtually every American school then in existence; and, indeed, over two-thirds of American medical schools were then forced out of business by 1912. The Flexner report demanded the following, elements we now take for granted: A preliminary four-year baccalaureate education in the humanities, social and biological sciences and nationwide medical school admissions examination testing cognitive, verbal and mathematical skills. Each medical school to be embedded within a university with a serious 4-yr curriculum, two years devoted largely to the basic medical sciences, a fulltime premedical and medical faculty with their role primarily in teaching and research, university-managed hospitals closely integrated with the medical school, and a uniform, nationwide set of qualifying examinations for licensure.

So, now to 1946: the first year of global peace since 1939: Harry Truman is president, all telephones are connected to neighboring walls by black wires and one could bring one's children to any movie theater without fear of moral corruption. My rotating internship takes place, in 1946, at Bellevue Hospital, New York City, a 2,400 bed and major teaching institution.

Bellevue was the quintessential municipal hospital begun in 1795 during th city's yellow fever epidemic. It was the model for the many subsequent, historically famous city hospitals. By 1816, Bellevue had expanded into a 26 acre enclave comprising a penitentiary (with outdoor plaza for public executions), an alms house with a wing for arrested street-walkers, the city morgue, workhouses, a foundling home (over 1,000 infants were abandoned there each year)—and a general hospital largely for pestilential disease.

It was a huge structure of grey granite blocks, as enduringly solid as the moral faith of those who willed its construction. Its purpose was twofold: to isolate the many municipal depravities (communicative or moral) and to instill abject humility in those harbored within its walls. Bellevue, in the 19th Century, blurred the distinctions between criminality, vagrancy, moral dissoluteness, mental deficiency, abject poverty and organic illness.

The internship of 1946 was a fulltime 24 month experience, a rigorous—vaguely monastic—process and an annealing, moral exercise. We all lived in the hospital dormitory, wore whites, ate their contrived diet and were each paid $18.75 per month, with a bonus of a large package of Philip Morris cigarettes at Christmas.

My first assignment was to Bellevue's Emergency Room. Let me hasten to explain that seeking emergency medical assistance in 2011 bears no resemblance to the ER population of 1946. The ER then was truly a site of last resort and no middle class adult, except victims of auto accidents, ever frequented such medical establishments. The demography of ER usage in the 1940's reflected the greater employment of the municipal hospitals, historically, as refuges for the dispossessed.

What was an ER like in 1946? First its entry illuminated by a green light—a door never locked, never idle—leading to a large waiting room filled with wood benches, more crowded in the winter when many itinerants sought shelter to warm themselves. It was the ultimate goal of the acutely distressed, the injured and so often, the lonely and homeless. No fees were charged and therefore no clerical personnel were present. The supervising nurse at an outer desk looked more like a stern classroom teacher than a nurturing soul. And her assistants ? Two patrolmen in full uniform.

A word about hospital uniforms. The nurse of the 1940's lived in the hospital, was typically unmarried, poorly salaried and always dressed in an immaculate white uniform. No nurse went without her identifiable nurse's cap indicative of her nursing school of training—each with its characteristic millinery

contour. And each RN displayed her precious gold pin denoting her educational achievement. Interns and junior residents wore white blouses with short white jackets, pockets heavy with diagnostic instruments, notebook, Merck manual and jacket lapels adorned with 22 gauge syringe needles. Chief residents, the immediate icons of relentless authority, were allowed to wear long white coats similar to those employed by junior faculty. The senior faculty—those austere members of an illustrious medical pantheon—wore 3-piece business suits with vests adorned by a gold chain and a pocket watch.

The core of the ER—its sole reason for being—was the central treatment room, well-illuminated, with chairs along its margins and numerous, wheeled gurneys holding those too ill to sit. A triage system determined the speed with which each supplicant was seen—those acutely bleeding or visibly injured were brought in first. Mothers with ailing children were also given priority, partly to diminish the waiting room noise. Privacy was a low priority and reserved only for women with gynecological distress.

Suturing was an art quickly learned by the ER intern. On some nights, dreaded by the staff, there were countless stab wounds and lacerations occupying the gurneys. The interns speculated on such etiologic factors as the phase of the moon, the barometric pressure or, if they ever heard of it, the Dow Jones average.

Rubber gloves were not expendable items but were cleansed and reused. For the overly taxed intern, a single pair of gloves might last an entire 12 hour shift, not to be changed unless the glove was damaged. At the margins of the central treatment room was a large basin filled with a bluish solution, mercuric bichloride (corrosive sublimate); and after contact with each patient, we rinsed our gloved hands in this antibacterial solution.

Local anesthetics were rarely employed since so many patients were dulled by prior alcoholic intake. And there were uniformed police stationed in the treatment arena to help with unruly patients.

Restlessness was not uncommon amongst the ER patients and occasionally it verged upon manic behavior. We learned quickly—aided by those men in blue—how to don strait jackets upon the excessively inebriated or delirious. The jacket—a restraining camisole—was of heavy canvas with excessively long sleeves which are crossed ventrally and securely tied dorsally. Sedation was achieved through the oral administration of chloral hydrate, a rapidly acting sedative known by its street-name of Mickey Finn.

If, like Marcel Proust, I needed an olfactory reminder of my consignment to the ER, it would be the sickly sweet aroma of chloral hydrate. Indeed, in an era before air-conditioning, each area of Bellevue had its distinctive odors: the ER with its stench of chloral hydrate; the operating rooms with the persistent smell of ether, the obstetrical floors with that curiously appealing odor of the newborn infant, and the vast 36-bed general wards reeking of chlorine (and with a faint ammonia hint) reminiscent of a swimming pool. Those ward floors were swabbed with a chlorinated soapy solution, by student nurses, every eight hours. And then there was the distinctive aroma of Sneaky Pete. It consisted of a pint of unbonded brandy added to a quart of cheap claret wine to produce a cloudy, curiously sweet-odored mixture, the principal intoxicant for most of NYC's vagrant population. Its fragrance on the breath of ER patients was as distinctive as a Chanel perfume.

What else to remember from one's servitude in the ER? (12 hr shifts, six days/week, 72 very active hours/week): Certainly the commonness of alcohol as an accompaniment of civil and domestic disputes; the expanding use of heroin and its inevitable withdrawal syndromes, the emergence of tropical disease in a temperate setting, afflicting newly discharged army veterans, the countless children with measles, mumps, pertussis and, most dreaded of all, diphtheria perhaps requiring tracheotomy.

April, 1947: A visitor from Mexico to NYC brought with him the virus of smallpox. He transmitted the infection to some neighbors in upper Manhattan; and the decision was then made to revaccinate the entire NYC population, this task assigned to the municipal hospital medical staff. And so, each intern was assigned to a street corner with an RN nurse to assist and a student nurse (or medical student) to help further and to act as a local recorder. We vaccinated a new candidate about every three minutes; and in the course of a 12 hour day, about 250 persons. Before the campaign was halted over two weeks hence, over five million humans were vaccinated—and the smallpox outbreak was halted—but at a cost.

What did those of us in the ER dread the most in our daily encounters with Manhattan's sickest? It was the middle-aged male alcoholic who was concurrently a diabetic. This was a person who was ill-equipped to manage his diabetic state, indifferent to his basic hygienic needs and often too obtunded to realize the gravity of his deteriorating clinical condition. His chief complaint, often, was painful feet and what we feared most was vascular insufficiency of his legs with signs of impending gangrene. Faciocerebral mucormycosis was yet another complication in a diabetic with acidosis.

A few reflections about the inpatient services at Bellevue. For those of us who find a contemporary semiprivate hospital room, with two beds and about 440 square feet of floor space, too crowded, it might be well to ponder upon a typical adult medical ward at Bellevue in 1946.

You enter a vast room, about 90 feet long, housing, seasonally, 36 to 48 beds, a chamber bereft of frivolity, ornamentation or excessive sound. Everything is grey or white including the nurse's starched uniforms. Amenities are few. Getting a non-lumpy mattress or a warm bedpan was deemed a sign of benevolent attention. Visiting hours were 1 to 3 PM and only 2 adult visitors allowed per patient.

Short-term clinical outcomes were generally good not because of any miraculous medications but because of meticulous nursing, good food with no alcohol, and most of all, a temporary parole from some wretched tenement or homeless shelter from whence they had come. Good inpatient care, in their thinking, was measured by a warm bed, abundant food and a respite from the loneliness that most had customarily experienced.

What else distinguished an internship in 1946 from one in 2011? Certainly more than the salaries or even the ambience of the hospitals. The newly graduated physicians of the current era are vastly better educated, more sensitive to the tenets of preventive medicine and strikingly more compassionate to those seeking their

healing help. The average intern today has seen more of the world and is more cognizant of the ethnic diversity of those asking for medical aid. The institutional hierarchy then was more personalized, more strictly observed, and a chief resident or a charge nurse (called matron to her face and less appealing names behind her back) were awesome figures of inflexible authority. To experience the ancient halls of Bellevue, please read Charles Dickens.

We gave little thought, in 1946, to causal relationships or the fundamental precepts of clinical epidemiology. Each patient was an idiosyncratic case-study of one unrelated to broader communal trends. We paid much attention to the daily temperature-curves, seeking patterns for example, suggestive of tuberculosis or typhoid. The odor of a patient's breath might hint at impending acidosis or a gram-negative pneumonitis. And the texture of his forehead might suggest impending uremia. Nor did we retreat at the sight of head-lice. Auscultation was a high art in an era dominated by rheumatic and syphilitic heart disease. Urinalysis and blood counts were done by the interns, and blood chemistries were a research intervention.

The nurses of 1946 were more compliant, more religiously motivated and, sadly, were taught always to stand when a physician entered the premises. The nurses of today, substantially better educated, are now partners in this complex enterprise called healing.

We 1946 physicians were given far greater latitude in patient-care; we had no therapeutic protocols to follow, nor were we that closely supervised in our attempts at clinical management; and, on average, in our missionary zeal, we made many more mistakes. Our cumulative clinical experiences indoctrinated us with a variable mixture of courage, intemperate arrogance, indecisiveness and perhaps, an emerging awareness of our relative ignorance.

We in 1946 were at the near margins of a new era of rational medicine with the discoveries antibiotics, steroids and other endocrinologic agents; in general, the sweeping discoveries that transformed medicine into a more exact science.

Of the multitude of experiences that I might recall, one stands out because it exemplifies how much we as a profession were then on the threshold of a modern, rational medicine where the great majority of patients might confidently expect to be healed.

Penicillin was discovered in the 1940's but until it was synthesized a decade later, its supply was severely limited. Accordingly, since much of parenterally administered penicillin spilled out in the urine, we routinely collected all of the urine from penicillin-treated patients, brought these numberless gallons to a basement room and slow boiled the volumes until reduced to mounds of yellowish powder, principally urates. These were then extracted with an ether mixture and the recovered penicillin happily re-injected into those ward patients.

And if we overly worked interns, salvaging precious penicillin, had time to reflect upon the Biblical words of Ecclesiastes (11: 1) we might have remembered that when we cast bread upon the waters, that after many days it shall return to us, perhaps even as penicillin, a renewable blessing for humanity.

(The Seebert Goldowsky, MD Memorial Lecture, delivered at Rhode Island Hospital, April 12, 2011.)

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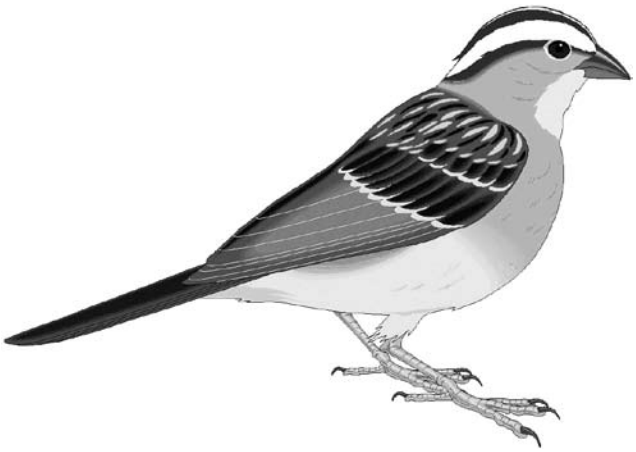

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The Farewell Column

Ana Tuya Fulton, MD, FACP

After four and a half years and 54 topics, the time has come for a transition in this column. It is with mixed emotion that I write this final column; proud to see it run its course, sad to have the topic change from geriatrics, relieved to pass the torch to others for their fresh thoughts, but overall proud that it served the community and was a forum for a monthly conversation on geriatrics topics.

The column first ran in January of 2007 and was envisioned as a vehicle to share resources and knowledge to help all practitioners care for the often complicated and challenging older adult population. There have been 44 different topics discussed since then, and two especially dedicated nursing home editions of the journal with ten more in-depth articles. Topics have been varied and have covered many of the commonly encountered medical conditions, as well as general issues on caring for older adults (Table). Column authorship was broad with articles written by senior academic geriatricians, junior faculty, geriatrics fellows in training, residents, nurse practitioners and other health professionals. The unifying theme among the authors has been a desire to improve the awareness of geriatrics issues and to provide all practitioners with knowledge and tools they need to care for older persons.

Today marks the final installment of "Geriatrics for the Practicing Physician". The column will be reborn in July as "Quality Improvement and Patient Safety for the Practicing Physician" edited by Drs. Brian McGillen and Sarita Warrier. Quality and patient safety have become a major focus for the practice of medicine and among accrediting organizations. All hospitals and practitioners are being challenged to adhere to new standards and further improve quality.

It is fitting that the column is going from a column on Geriatric medicine to one focused on quality and patient safety. Older adults are those that are often at highest risk for entering into health care systems, having adverse outcomes and experiencing

Publication Date	Topic
January 2007	Comprehensive Geriatric Assessment
February 2007	Medication Management
March 2007	Falls
April 2007	Transitions of Care
May 2007	Palliative Care & Hospice in Nursing Homes
June 2007	Insomnia
July 2007	Nursing home edition
	Culture Change
	Medical Director Role
	Transitions of Care
	Infections
	"Big hitter" issues
August 2007	Elder Abuse
September 2007	Chronic Dizziness
October 2007	Osteoporosis and Vitamin D deficiency
December 2007	Hypoactive Delirium
January 2008	Use of PEG tubes in Alzheimer's
February 2008	Nutrition and Failure to Thrive
March 2008	Home Visits
April 2008	Hospice Referral Indications
June 2008	Clinical Case Series
August 2008	Reynolds Grant Progress Article
September 2008	Hospital Transitions of Care
October 2008	Sex in the Older Adult
November 2008	Determination of Prognosis
December 2008	Pressure Ulcer Diagnosis, Staging, Risks
January 2009	Pressure Ulcer Treatment
February 2009	Cancer Screening
March 2009	Caregiver Stress
April 2009	Anticoagulation and Atrial Fibrillation
May 2009	Dementia & Behavioral Disturbances
June 2009	Depression in the Older Adult
July 2009	Hip Fracture Management
August 2009	Fall Prevention
September 2009	Myelodysplastic Syndrome
October 2009	Column Reader Needs Assessment
November 2009	Urinary Tract Infection
December 2009	Medication Non-Adherence
January 2010	Defibrillators in Older Adults
April 2010	Transitions of Care and Dementia
May 2010	ESBL Infection
June 2010	BMI and Mortality
July 2010	Non-cancer Pain Management
August 2010	HIV
October 2010	Nutrition
November 2010	Fecal Incontinence
December 2010	Nursing Home Special Edition
	Pressure ulcers
	Dementia in LTC
	Antipsychotics
	Palliative care in Dementia
	H1N1 Pandemic
February 2011	Caregiver Special Edition
March 2011	Prevention and the ACA
April 2011	Electroconvulsive Therapy
May 2011	Vaginal Atrophy
June 2011	Conclusion and Transition

a greater number of health care transitions. At the March 2011 Quality Partners of Rhode Island (QPRI) sponsored Transitions of Care Summit it was clear to me that our state is poised to be at the forefront of the sea of change in health care transitions. The changes coming to improve the quality of patient transitions will bring with them attention to patient safety and quality of care. Additionally, the incentives being promoted by the Affordable Care Act will push the focus on quality of care and patient safety even more to the forefront. There will be more incentives to support high quality care, reduce adverse events, and improve prevention and screening. It is an exciting time both locally and nationally with all of the ongoing and new initiatives to improve what we do and how we do it. The new column will be poised to share this with the readership. I am excited to follow the new column and the changes that are coming.

Acting as editor of this column has been a remarkable opportunity for me, and one from which I have learned a great deal. I would like to take this opportunity to thank all of our supporters. You, for your readership and the feedback you have given me to help improve the column over time and to suggest and contribute topics. Thanks also to all of the contributors (62 by my count) who have submitted articles. Thanks to those who have helped review and edit articles while sharing your area of expertise. Finally, the Centers for Medicare & Medicaid Services (CMS) whose support through QPRI, the Medicare quality improvement organization for Rhode Island, have provided the funding permitting monthly publication of the column. These articles have fostered better, safer and timelier care of our older adults, along the themes of the prior 8th and current 9th scope of work QPRI does under contract with CMS.

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Disclosure of Financial Interests

The author and/or spouse/significant other has no financial interests to disclose.

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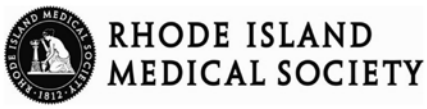

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Partnering To Improve Hospital-Physician Office Communication through Implementing Care Transitions Best Practices

Rosa Baier, MPH, Rebekah Gardner, MD, Stefan Gravenstein, MD, MPH, and Richard Besdine, MD

Introduction

Although many Rhode Island physicians communicate effectively with one another when performing patient hand-offs, there is a great deal of variability in how well care transitions are performed. When inpatient-outpatient care transitions are well executed, communication includes timely and accurate clinical information that enables downstream physicians to immediately assume responsibility for patient care[1,2,3] and activates patients and their caregivers to better self-manage.[4,3] These processes can improve health outcomes and patient satisfaction, decrease healthcare costs, and ensure that patients understand how, when and where to seek help.[4,5,6] This is true both for patients transitioning from the community to the hospital and for those transitioning from the hospital back to the community.

In reality, however, care transitions require complex time-sensitive communication and the wide variation in how well this is accomplished indicates ample room for improvement. In our increasingly fragmented healthcare system, in which hospitalists often manage inpatient care and length of stay is decreasing, inpatient and outpatient physicians often do not have the information they need to ensure seamless care delivery within or between settings or to ensure high-quality outcomes. For patients discharged from the hospital, for example, this can result in medication errors,[7] incomplete transfer of discharge information to downstream clinicians (including community physician offices)[8,9] and increased healthcare utilization,[10] all of which reduces the likelihood of optimal patient outcomes.

Rhode Island is a recognized leader in care transitions, with more than 25 years of experience implementing standardized communication using the Department of Health's Continuity of Care Form, completion of which is required for facility-to-facility transfer.[11] However, available data underscore what physicians say: that there are opportunities to further improve our local leadership in care transitions processes. In 2009, the Commonwealth Fund's State Scorecard on Health System Performance ranked the state 49th out of 51 for ambulatory care-sensitive hospital admission among Medicare beneficiaries[12] and Rhode Island Department of Health data demonstrate that 22% of hospitalized adults were readmitted to the same hospital within 30 days of discharge.[13] Both ambulatory care-sensitive admissions and hospital readmission are considered somewhat preventable with high-quality outpatient care and hospital discharge, respectively, and re often used as proxy measures for care transition outcomes.

Quality Partners of Rhode Island, the Medicare Quality Improvement Organization, was awarded a Medicare contract to implement a three-year care transitions program. The Safe Transitions Project aimed to improve the safety of patient care transitions by translating effective patient and provider interventions into sustainable systems change. After testing evidence-based interventions locally and systematically gathering input on physicians' preferences and needs, Quality Partners collaborated with physicians, health plans and community leaders to develop a series of best practices intended to elevate the quality of communication between hospitals and community physician offices. Best practices are evidence-based care processes proven to improve care transitions outcomes.

Objective

To develop hospital and community physician office care transitions best practices that reflect the evidence base and are incorporated into health plan contracting, where possible.

Methods

The Safe Transitions Project's community advisory board includes wide stakeholder representation, including inpatient and outpatient physicians, commercial health plans, Medicaid, and representatives from home health, hospice, hospital, skilled nursing, and physician office settings. In 2010, Quality Partners collaborated with the advisory board to undertake a three-phased approach to best practice development.

Evidence base review

We reviewed the medical literature and national campaigns to identify evidence-based processes that (alone or grouped together) improved care transition outcomes. This included a literature

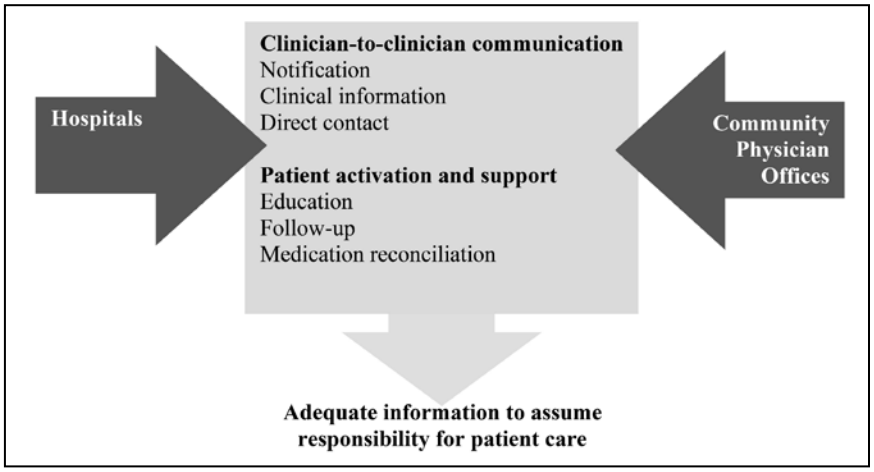

Figure 1: Best Practice Content and Information Flow

Best Practice*	Select Evidence Base								Local Preference
	BOOST[1]	CHF[2]	Consensus[3]	CTI[4]	Jt Comm[5]	NQF[7]	RED[7]	Misc.[8]	
Hospitals									
1. Notify community physician office about ED visits and hospital admission.									X
2. Provide receiving clinicians with hospital clinician's contact information upon discharge.	X	X	X						X
3. Provide patient with effective education prior to discharge.	X		X			X	X		X
4. Provide patient with written discharge instructions prior to discharge.	X		X			X	X		
5. Provide patient with follow-up phone number prior to discharge.	X		X	X			X		
6. Perform medication reconciliation prior to discharge.	X		X	X	X	X	X	X	X
7. Schedule patient outpatient follow-up appointment prior to discharge.	X					X	X	X	X
8. Provide community physician office with summary clinical information at discharge.	X	X	X			X		X	X
9. Invite primary care physician to participate in end-of-life discussions during hospital visit.									X
Community Physician Offices									
1. Provide the ED with clinical information when referring patients for evaluation.			X			X			X
2. Respond to time-sensitive ED and hospital clinical questions verbally, if needed.		X	X						X
3. Provide ED and hospital clinicians with access to outpatient clinical information, if needed.			X						X
4. Confirm outpatient receipt of discharge information from the hospital.	X					X			
5. Outreach to high-risk patients via phone after ED or hospital discharge.	X			X			X	X	
6. Conduct follow-up visit with patients discharged from the hospital to the community.	X	X		X			X		
7. Perform outpatient medication reconciliation for patients discharged from the ED or hospital to the community.		X	X	X	X	X	X	X	

* Detailed specifications are available upon request. These include data source, numerator, denominator, population, and comments/definitions.
1 Project Better Outcomes for Older adults through Safer Transitions (BOOST). Available: www.hospitalmedicine.org/BOOST/, 11 Apr 2011.
2 California Healthcare Foundation (CHF). The post-hospital follow-up visit: A physician checklist to reduce readmissions. Available: http://www.chcf.org/~/media/Files/PDF/P/PDF %20PostHospitalFollowUpVisit.pdf, 11 Apr 2011.
3 Transitions of Care Consensus Policy Statement: American College of Physicians, Society of General Internal Medicine, Society of Hospital Medicine, American Geriatrics Society, American College Of Emergency Physicians, and Society for Academic Emergency Medicine. *J Hosp Med* 2009; 4:364-70
4 Care Transitions Intervention (CTI). Available: www.caretransitions.org, 11 Apr 2011 and Coleman EA, Parry C, Chalmers S, Min SJ. The care transitions intervention: results of a randomized controlled trial. *Arch Intern Med*. Sep 25 2006;166(17):1822-8.
5 Joint Commission National Patient Safety Goal on Reconciling Medication Information (Jt. Comm). Available: www.jointcommission.org/npsg_reconciling_medication/, 8 Apr 2011.
6 National Quality Forum (NQF). Safe Practices. Available: http://www.qualityforum.org/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=18338, 11 Apr 2011.
7 Project Re-Engineered Discharge (RED). Available: www.bu.edu/fammed/projectred, 11 Apr 2011 and Jack BW, Chetty VK, Anthony D, et al. A reengineered hospital discharge program to decrease rehospitalization: a randomized trial. *Ann Intern Med*. Feb 3 2009;150(3):178-87.
8 Misc.: Miscellaneous sources, available upon request.

Table 1: Hospital and Community Physician Office Best Practices and Select Evidence Base

search and review of the following: **Better Outcomes for Older adults through Safer Transitions (BOOST)**;[14] the **Care Transitions Intervention (CTI)**;[3] the **Joint Commission's National Patient Safety Goal on Reconciling Medication Information;**[15] **Project Re-Engineered Discharge (RED)**;[4] and the **National Quality Forum's (NQF's)** Safe Practices.[16] We placed the evidence base in the context of local data and preference, such as results and knowledge from the Safe Transitions Project's interventions, a hospital community of practice, and a community physician survey about communication needs and preferences.

Vetting process

After drafting best practice concepts, definitions and metrics, we met with hospital and physician office stakeholder groups to refine the best practices and ensure feasibility within each setting's existing workflow. This step included discussions with hospital quality directors and the Rhode Island Department of Health's **Primary Care Physician Advisory Council (PCPAC)**, among others. Health plan auditors also reviewed the hospital best practice metrics.

Endorsement and adoption process

After finalizing the best practices, we sought buy-in from key stakeholders, including hospital and physician office clinicians, commercial health plans, Medicaid, and the Rhode Island **Office of the Health Insurance Commissioner (OHIC)**.

Results

The best practices focus on bi-directional communication between hospitals and community physician offices. (See Table 1) Each set is limited to actions within the control of physicians or other clinicians in that setting and targets: (1) clinician-to-clinician communication and (2) patient activation and support. (See Figure 1) They also reflect the fact that physicians express a willingness to change their communication practices, if assured they will receive the information they want, when they need it. The related definitions and metrics [available upon request] ensure consistent implementation and measurement across settings and payors. We did not set or recommend benchmarks for these metrics, recognizing that baseline rates remain unknown and achievable adherence within real-world constraints will not reach 100% for each best practice.

Hospital quality directors from the state's 11 acute-care hospitals endorsed the hospital best practices. Additional hospital best practice outreach included discussions with hospital executive leadership, at each facility's discretion. Two **primary care physician (PCP)** groups endorsed the community physician office best practices: PCPAC and the **Rhode Island Health Center Association's Clinical Leadership Committee**. **Blue Cross & Blue Shield of Rhode Island** and **Leading Age Rhode Island**, a nursing home trade association, also endorsed the community physician best practices.

The commercial health plans and **Rhode Island Chronic Care Sustainability Initiative** (**CSI-RI**), the state's all-payer patient-centered medical home program,are incorporating the best practices into hospital and physician contracting, respectively, with contract initiation and renewal.

Discussion

Locally and nationally, poor care transitions usually result from three root causes: missing, wrong, or delayed information; delayed or unscheduled follow-up testing and appointments; and poor adherence to recommended and needed medication therapy. The hospital and community physician office best practices aim to elevate local care transitions by addressing these root causes and aligning the resultant systems change with measurement (accountability) and payment (incentives). This approach is intended to ensure community consensus and target known misalignments, such as the fact that reduced hospital readmission decreases hospital census and revenue, impeding hospital executives' ability to prioritize and make the financial business case for improving care transitions.

The best practices incorporate the evidence base, including Quality Partners' work to implement two **randomized, controlled trial** (**RCT**) patient interventions proven to reduce hospital readmission by approximately 30% in RCTs. Project RED includes a National Quality Forum-endorsed discharge checklist and is provided during inpatient discharge education.[4] The **Care Transitions Intervention** (**CTI**) is a 30-day health coaching intervention that begins in-hospital and continues in the community, focusing on patient activation.[3] Both models were developed by physician researchers (Drs. Brian Jack and Eric Coleman, respectively) and include best practice concepts such as medication reconciliation, outpatient follow-up, and the ability for patients to outreach to their physician's office before worsening symptoms become emergent. The use of local experience and data helped generate stakeholder buy-in during the vetting process.

While the best practices reflect community consensus and standardized definitions and measurement, they afford physicians broad license to determine which processes to implement and how. In other words, the best practices focus on defining *what* high-quality care transitions entail, not *how* these actions are accomplished—recognizing that some physicians have already accomplished these processes and also that successful implementation strategies will depend on unique circumstances, such as existing workflow, staffing, electronic medical record adoption, and even physical location. Additionally, over time, some of these concepts may be automated through health information technology; for example, as the Rhode Island Quality Institute incorporates PCP notification of ED visits and hospital stays into the state's health information exchange.

Several additional aspects of the best practices and their development are significant. First, they require reciprocal actions from hospitals and community physician offices. Physicians in both settings express frustration if they fail to receive the clinical information they need to assume responsibility for patient care: improving half of the equation would not solve the problem in its entirety. Second, we used stakeholder consensus to draft and vet the best practices. Partnering with the Safe Transitions Project's advisory board, which includes diverse clinician and payor representation, ensured buy-in for aligning implementation with payment. Finally, vetting the draft best practices with hospitals and PCP groups, among others, helped to further refine the concepts, ensure face validity and feasibility, and spread awareness and support.

Although a primary goal was to align implementation with payment, having clinicians and payors participate in development required us to preempt any issues regarding health plan collusion. We segregated discussions about clinical processes from discussions about payment models, and hospital-payor payment models and contracting negotiations remained confidential. OHIC also helped preempt problems with collusion by directing the commercial health plans to contract with hospitals to imple-

Imagine that you are a hospitalized patient in the process of being discharged. The moment you are wheeled outside the hospital to your waiting ride, who is responsible for your care? What is your own accountability? If you have a question, should you call the hospitalist who oversaw your inpatient care or the outpatient physician you have seen for years? Does physician accountability depend on what discharge information is sent from one setting to another and when, or is it independent of information flow? The question of physician accountability at the point of transfer from one setting to another, such as inpatient to outpatient, is a cornerstone of the debate on care transitions.

As a patient, you may assume that your physicians are in regular communication—that your outpatient physician, whether it is your PCP or a specialist, knows about your hospital stay and is poised to oversee your follow-up care. When you arrive at your physician's office for a post-hospital follow-up appointment, would you be surprised to learn that your physician didn't know hospital stay until after your discharge? Or still doesn't know? Maybe the hospital faxed information that has been filed by office staff or maybe that information has not yet been sent. While most patients would be surprised by this scenario, many physicians are not. There are times when we are in regular communication with one another about patient care. But we routinely deal with scenarios like this one, where we are expected to assume responsibility for patient care—but may not have all the pertinent clinical information.

Quality Partners' work to develop best practices that optimize inpatient-outpatient physician communication and activate patients addresses this information imbalance.

ment the hospital best practices and included the community physician best practices in CSI-RI's physician contracts.

We note several limitations, most significantly that relatively few interventions in the care transitions medical literature focus on community physician office (vs. hospital) care processes. Much of our community physician office evidence base is drawn from national campaigns, local preference, and expert consensus, including a checklist for post-hospital follow-up.[17] Additionally, as with most quality improvement projects, many widely-acclaimed interventions include multiple processes proven to work when implemented simultaneously, but have not been tested individually. For example, CTI includes four concepts, including medication reconciliation and outpatient follow-up. As mentioned above, the RCT reduced hospital readmission by 30%;[3] locally, Quality Partners demonstrated similar effectiveness in Rhode Island.[18] While the efficacy of individual elements of the CTI mode is unknown, we included medication reconciliation and outpatient follow-up in both sets of best practices, because these concepts are reinforced elsewhere in the evidence base and supported by local physicians. The same is true of other best practice concepts that have not been tested in isolation.

As national dialogue about healthcare reform shifts to accountable care models, opinion leaders increasingly emphasize the importance of establishing community goals and aligning payment with these goals. These best practices help to articulate Rhode Island's expectations for care transitions, addressing questions about accountability and information flow while correcting known misalignments within the system. They codify local consensus around care transitions, creating metrics and definitions that elevate proven interventions to sustainable systems change and define our community's vision—and they are also "aspirational," setting a high bar for care transitions excellence. Future research will address the need to establish baseline rates for these metrics, determine the efficacy of individual best practices, and establish cross-setting partnerships to test both sets of best practices simultaneously.

Next Steps

Rhode Island physicians have demonstrated their commitment to quality through initiatives related to health information technology, patient safety, and patient-centered medical homes. To further elevate patient care and address known physician frustrations, physicians should review the best practices and identify those that they can incorporate into their clinical practice. Suggested first steps include mapping current cross-setting communication with community partners; prioritizing implementation by establishing baseline rates for the best practice metrics; and reviewing the evidence base cited in Table 1 to identify improvement strategies. Community physicians may also want to incorporate advance care planning discussions into routine patient visits andeducate their staff about the importance of early office visits or phone follow-up for patients with recent hospitalizations. This may include having front office staff ask patients if they were recently hospitalized and triage these calls appropriately. advise staff to ask patients about recent hospitalizations and ensure these patients receive timely appointment or phone follow-up.

Physicians interested in informing the development of home health and skilled nursing facility best practices should contact the corresponding author.

Disclaimer

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Through community collaboration, the Safe Transitions Project aims to transform the Rhode Island healthcare system into one in which discharged patients understand their conditions and medications, know who to contact with questions, and are supported by healthcare professionals who have access to the right information, at the right time. This is our vision statement.

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Health By Numbers
Rhode Island Department of Health • David Gifford, MD, MPH, Director of Health
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Disparities in Awareness of the Warning Signs and Symptoms of a Heart Attack and Stroke among Rhode Island Adults

Deborah N. Pearlman, PhD, Patricia Affleck, MS, and Dona Goldman, RN, MPH

Early treatment after a heart attack or a stroke is critical to lowering the risk of disability and death. The survival benefit is greatest when **thrombolytic** agents are administered within one to three hours after symptom onset.[1,2]

Median delay time from symptom onset to hospital arrival in U.S. studies ranges from 1.5 to 6.0 hours.[3] Treatment-seeking delays include the time intervals 1) from symptom recognition to the decision to seek medical care; 2) from the decision to seek medical care to first contact with the healthcare system; and 3) from first contact with the healthcare system to treatment.[3] Once patients arrive in a hospital for care, the delay in getting treatment is small. The longest delay continues to be the time from symptom recognition to the decision to get medical attention.[3] Thus, assessing the public's knowledge of heart attack and stroke warning signs and symptoms is an important first step for designing interventions that may decrease time to treatment and improve patient outcomes. [4,5,6,7]

In 2009, the **Rhode Island Department of Health (HEALTH)** included a module on awareness of heart attack and stroke warning signs and symptoms as part of the **Behavioral Risk Factor Surveillance System (BRFSS)** survey, followed by two public awareness campaigns.[8] This study reports baseline findings from the BRFSS survey. It also presents findings on length of stay and associated costs when myocardial infarction or stroke was the primary reason for a hospital discharge in 2008 and 2009. Rhode Island's Hospital Discharge Data will be analyzed again in 2012 after the two public awareness campaigns have ended.

Methods

The BRFSS is a random-digit-dial telephone survey of adults age 18 years or older. The **Centers for Disease Control and Prevention (CDC)** provides national oversight to participating states. This report uses information from the 2,580 respondents age 40 and older who received the 2009 Rhode Island BRFSS module on heart attack and stroke signs and symptoms.

Respondents were asked to identify the major warning signs and symptoms of a heart attack and stroke in a series of close-ended questions that included two incorrect signs (sudden trouble seeing in one or both eyes for heart attacks and chest pain for strokes). Response options for all questions were "yes," "no," and "don't know/not sure."

We computed one heart attack and one stroke knowledge score for each respondent. Respondents received 1 point for each correct answer, with an additional point if they would call 9-1-1 as their first action if they thought someone was having a heart attack or stroke. Other options included taking the person to a hospital, advising the person to call a doctor, calling a spouse or family member, or doing something else. Each score ranged from 0 to 6. Data were weighted to the 2009 state population estimates. Statistically significant differences between groups were determined by non-overlapping 95% confidence intervals.

Data on inpatient admissions came from the 2008-2009 Rhode Island Hospital Discharge Data files. Our analyses focused on admissions to one of 11 acute care general hospitals where acute myocardial infarction (ICD-9-CM 410) or a stroke (ICD-9-CM 430-438) was listed as the principal diagnosis for persons age 40 and older. We calculated length of stay and costs separately for non-Hispanic whites, non-Hispanic blacks, and Hispanics. Because hospital charges do not represent the cost of an inpatient admission, the charges were multiplied by a cost factor ratio specific to each hospital. The unit of analysis was the admission, not the individual patient. We used SAS software version 9 for all analyses.

Findings

In 2009, nearly all Rhode Island adults age 40 and older (96.4%) knew that chest pain or discomfort was a heart attack warning sign. Only 38.6% of respondents knew all five warning signs and symptoms. The average score for correctly recognizing all five heart attack warning signs and the importance of first calling 9-1-1 was 4.8 with a range of 0 to 6 (Table 1).

The two most commonly recognized stroke warning signs were sudden numbness or weakness of the face, arm, or leg (98.2%) and sudden confusion, trouble speaking, or understanding (97.2%). Awareness of all five signs and symptoms was low (44.5%). The average score for correctly recognizing that someone might be having a stroke and the importance of first calling 9-1-1 was 4.9 with a range of 0 to 6 (Table 1).

Non-Hispanic whites generally had a higher awareness of individual heart attack or stroke warning signs and symptoms than racial/ethnic minorities. Twenty-five percent of racial/ethnic minorities and 40.1% of non-Hispanic whites correctly identified all five heart attack warning signs and symptoms. In addition, 32.5% of racial/ethnic minorities and 45.8% of non-Hispanic whites were aware of all five major stroke signs. However, the minority groups had wide (and thus less precise) 95% confidence intervals due to small sample sizes (Table 1).

Among patients age 40 and older, non-Hispanic whites had a significantly longer average length of stay for myocardial infarction than Hispanics. Non-Hispanic blacks and Hispanics had longer lengths of stay and higher costs, on average, for stroke than non-Hispanics whites, although the smaller sample sizes for Hispanic and, non-Hispanic black patients resulted in larger standard errors and wider confidence intervals (Table 2).

Table 1. Percentage of Rhode Island adults aged 40 and older recognizing correct and incorrect heart attack and stroke warning signs and action taken if a heart attack or stroke occurs by race/ethnicity.

BRFSS Survey Questions	Total (n = 2580) % Yes (95% CI)[1]	Minorities[2] (n = 266) % Yes (95% CI)	White, non-Hispanic (n = 2280) % Yes (95% CI)
Heart Attack Signs & Symptoms			
Chest pain or discomfort	96.4 (95.7 – 97.2)	88.4 (83.7 – 93.1)	97.2 (96.6 – 97.9)
Pain in arm or shoulder	93.6 (92.4 – 94.7)	83.7 (77.6 – 89.7)	94.7 (93.7 – 95.8)
Shortness of breath.	90.1 (88.7 – 91.5)	85.3 (80.0 – 90.6)	90.6 (89.2 – 92.1)
Pain or discomfort in the jaw, neck, or back	70.5 (67.9 – 73.0)	55.5 (45.8 – 65.1)	71.9 (69.4 – 74.6)
Feeling weak, lightheaded, or faint	67.0 (64.4 – 69.5)	58.5 (48.8 – 68.2)	67.9 (65.3 – 70.5)
Sudden trouble seeing in one or both eyes (*Incorrect*)	35.6 (32.9 – 38.3)	48.6 (38.8 – 58.4)	34.1 (31.3 – 36.9)
Aware of all (correct) five signs	38.6 (36.1 – 41.0)	25.0 (17.1 – 32.9)	40.1 (37.5 – 42.7)
Stroke Signs & Symptoms			
Sudden numbness/weakness of face, arm, leg	98.3 (97.7 – 98.8)	93.0 (88.9 – 97.0)	98.9 (98.4 – 99.2)
Sudden confusion or trouble speaking	97.2 (96.5 – 97.9)	90.1 (85.4 – 94.8)	98.0 (97.4 – 98.5)
Sudden trouble walking, dizziness, loss of balance	92.7 (91.3 – 94.1)	84.7 (77.4 – 91.9)	93.6 (92.3 – 95.0)
Sudden trouble seeing in one or both eyes	86.0 (84.0 – 87.9)	70.6 (61.5 – 79.7)	87.5 (85.6 – 89.4)
Sudden severe headache no known cause	73.1 (70.5 – 75.7)	74.3 (65.1 – 83.4)	72.9 (70.1 – 75.6)
Sudden chest pain (*Incorrect)*	39.8 (37.0 – 42.7)	59.6 (49.8 – 69.3)	37.6 (34.7 – 40.6)
Aware of all (correct) five signs	44.5 (42.0 – 47.0)	32.5 (25.0 – 40.0)	45.8 (43.1 – 48.4)
First Action Taken			
Would call 9-1-1 if someone was having a heart attack or stroke	94.5 (93.4 – 95.5)	93.7 (90.3 – 97.1)	94.5 (93.4 – 95.6)
Knowledge Score	Mean (95% CI)	Mean (95% CI)	Mean (95% CI)
Knows all 5 heart attack warning signs and would first call 9-1-1	4.83 (4.77 – 4.89)	4.10 (3.84 – 4.36)	4.91 (4.85 – 4.97)
Knows all 5 stroke warning signs and would first call 9-1-1	4.94 (4.89 – 5.00)	4.35 (4.12 – 4.58)	5.00 (4.94 – 5.06)

Notes
[1] CI = confidence interval. The 95% CI indicate the range around the point estimate.
[2] Racial/ethnic minorities include Hispanics, Blacks non-Hispanic, other minority groups (Asians, Native Americans) and persons identifying as multi-racial who were not Hispanic.
Data source: 2009 Rhode Island Behavioral Risk Factor Surveillance System weighted data, Rhode Island Department of Health, Center for Health Data and Analysis.

Table 2. Mean length of stay and for myocardial infarction and stroke hospitalizations by race/ethnicity among Rhode Island adults ages 40+.

Characteristics	Number of hospital discharges (95% CI)	Average length of stay in days (95% CI)	Average costs (95% CI)
Myocardial Infarction			
Total patients (Aged 40+)	4570	4.9 (4.7 , 5.1)	$16976 (16514, 17438)
Race/ethnicity[1]			
Hispanic	136	4.1 (3.5, 4.7)	$18147 (15738, 20555)
Non-Hispanic Black	113	4.8 (3.8, 5.8)	$16803 (13654, 19952)
Non-Hispanic White	4096	5.0 (4.8, 5.2)	$16773 (16283, 17264)
Stroke			
Total patients (Aged 40+)	5898	5.0 (4.8, 5.2)	$9901 (9518,10284)
Race/ethnicity			
Hispanic	265	6.0 (5.0, 7.0)	$11922 (9468, 14376)
Non-Hispanic Black	242	9.0 (6.2, 11.8)	$15075 (11938, 18212)
Non-Hispanic White	5201	4.7 (4.5, 4.8)	$ 9447 (9068, 9826)

[1] Other racial/ethnic groups are not shown.
Data source: 2008-2009 Rhode Island Hospital Discharge Data, Rhode Island Department of Health, Center for Health Data and Analysis.

Conclusion

The disparities observed in this report suggest that Rhode Island should improve public awareness of heart attack and stroke warning signs and symptoms, especially among adults least likely to recognize them. Our findings add to the growing body of knowledge that improved awareness is particularly critical for racial/ethnic minority populations.[4-7, 9,10,11,12,13,14, 15,16,17,18]

The disparities observed in this report by race/ethnicity, however, likely reflect differences in educational level. In the 2009 Rhode Island BRFSS, the proportion of persons ages 40 and older recognizing all five major warning signs of a heart attack ranged from 21% for those who had not completed high school to 46% of those with 12 or more years of education. A significantly higher proportion of racial/ethnic minorities age 40 and older had not completed high school than non-Hispanic whites in this age group (21% vs. 5%). No differences were found in the proportion of respondents that would first call 9-1-1 if they thought someone was having a heart attack or stroke by race/ethnicity or level of education.

Delays in seeking help when someone is having a heart attack or a stroke play a major role in overall care delays.[19] Our study found longer lengths of stay and costs, on average, for non-Hispanic black and Hispanic patients age 40 and older hospitalized for a stroke as compared with their non-Hispanic white peers. Additional analyses indicated that non-Hispanic blacks and Hispanics were hospitalized for stroke at significantly younger ages, on average, than their non-Hispanic white peers. These findings suggest that Rhode Island should target public health information about stroke warning signs and symptoms to minority groups well before age 50. Of course, recognizing warning signs of a heart attack or stroke is only the first in a sequence of steps required for early and effective intervention. To maximize the benefits of thrombolytic therapy, patients must also receive rapid transport and treatment.

Two limitations of this study should be noted. First, the 2009 Rhode Island BRFSS data cannot be linked to

Rhode Island's Hospital Discharge Data, preventing assumptions that persons with low knowledge of warning signs in 2009 were hospitalized for a heart attack or a stroke during the study period. Second, neither the BRFSS nor the Hospital Discharge Data provide information on how quickly a person experiencing a heart attack or a stroke was transported to a hospital and started treatment; two factors that have been shown to influence patient outcomes.

In conclusion, the results of this study underscore the importance of public education campaigns to increase awareness of heart attack and stroke signs and symptoms. Rhode Island's Hospital Discharge Data provide a unique opportunity to see if public education campaigns decrease racial/ethnic disparities in length of stay and costs for Rhode Islanders hospitalized with a heart attack or stroke.

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Images In Medicine

Extensive Subcutaneous Soft Tissue Calcification—a Benign Differential Diagnosis

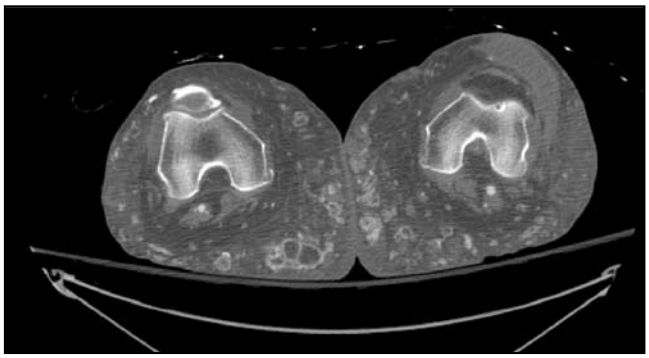
Kathryn McGillen, MD and Gregory Soares, MD

A 65 year-old female with hypertension, type 2 diabetes, and end stage renal disease on hemodialysis, presented with bilateral wet and dry gangrene. The patient had distal arterial Doppler signals, but no palpable pulses. A CT Angiogram of the lower extremities was performed. In addition to infrageniculate arterial stenoses, the CTA revealed extensive subcutaneous calcifications (Figures 1 and 2). Physical examination by the radiologist at the time of the CTA revealed diffuse, subtly palpable and firm subcutaneous nodules.

The differential diagnosis for such findings is extensive. Calciphylaxis is the deposition of calcium and phosphorus in the wall of small blood vessels secondary to end stage renal disease, which results in thrombosis, skin necrosis and ulceration. Fat necrosis or saponification causes subcutaneous masses on physical exam which are usually localized to sites of idiopathic trauma, such as injection sites.[1] Calcinosis cutis is associated with connective tissue disorders, such as CREST syndrome, dermatomyositis, Ehlers-Danlos, and systemic lupus erythematosus.[2] Metastatic calcinosis cutis is secondary to dystrophic calcification or calcium deposition in the skin around large joints and is associated with malignancy.[3]

Our patient had no history to support any of these possibilities. She did have chronic venous insufficiency[3, 4] with extensive venous varicosities. Calcinosis secondary to extensive thrombosis within these venous structures with phleboliths was considered, but most of the calcification was outside of the veins.

Finally, tumoral calcinosis secondary to chronic renal failure results from elevated levels of phosphorus and calcium, which is often clinically visible. While our patient's levels of phosphorus and calcium at the time of CTA were normal, she had a history of secondary hyperparathyroidism from her renal failure. This was felt to be the most likely cause of the impressive, but incidental findings on her CTA and no further treatment was necessary.



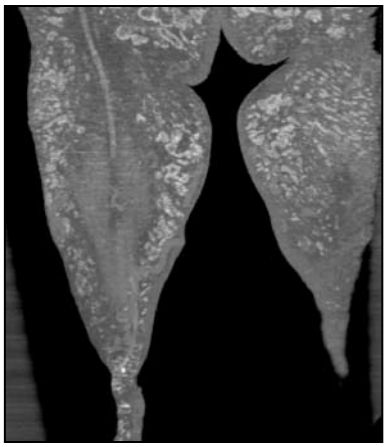


Figure 1. (above and left) Axial and coronal images from a CTA of the lower extremities, bone windows.

Figure 2. Radiograph of the left knee, demonstrating extensive calcification of the soft tissues in the same patient.

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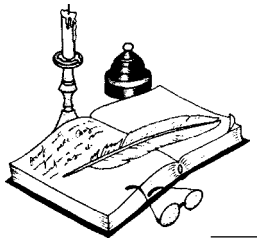

Physician's Lexicon

The Mother of All Measurements

In September of 1939, the month that witnessed the birth of World War II, a comic strip made its inaugural DC Comics appearance. It was called *Superman* and was the work of Joe Shuster and Jerry Siegel. And the city where Superman worked under guise of a newspaper reporter ? It was called Metropolis, a rather generic choice, and meaning, in Greek, mother city. It defined those mother cities in Attica from whence satellite cities were spawned when metropolitan adventurers founded distant Mediterranean colonies. The abbreviated word, Metro, has now taken on broader, more urbane meanings as synonyms either for the subway system, the downtown shopping center of a large city or, as the more abbreviated, Met, signifying an opera house or museum.

An earlier proto-Greek root, *metro-*, has yielded an abundance of English words with at least three overlapping meanings: (1) to measure, as in meter, geometry, metronome, metrology; and specific measurements within the arts such as the metronome of music or the metrics of poetical rhythm; (2) a human community or city, as in metropolis or metropolitan; and (3) uterus, as in metrorrhagia, metritis, endometrium.

Further medical terms built on the Greek, *metros*, include: metralgia, metrorrhexis, metroscope, metroperitonitis.

The Latin equivalent, *matri-*, gives rise to English words such as matriarch, matrilineal, matrimony, matrix (in its original sense as a synonym of a womb or uterus), matron, alma mater (our mother), matriculate (to register, to grow out of) but not mattress (from an Arabic word meaning a place to put things).

The Latin, *mater*, meaning mother, appears in words such as maternity, materfamilias, and the meningeal coverings of the brain: pia mater (literally, thin or delicate mother; the pia, a borrowed word from the Arabic), and dura mater (meaning tough, from the Latin, *durus*, as in English words such as endurance and duress.) Much of Arabic medicine employs metaphoric terminology particularly using terms such as mother or father to denote anatomic relationships.

The sense of measurement is incorporated in words using the root *–metry*, such as trigonometry. And the same root is used in a handful of words to define the meter, or metrical, of formal poetry.

And finally, there is the international metric system of measurement devised in France in 1791 using a decimalized set of measuring units. The system is almost universal: only three nations have not adopted it: Liberia, Burma and the United States.

– Stanley M. Aronson, MD

Vital Statistics

Rhode Island Department of Health
Michael Fine, MD
Interim Director of Health

Edited by Colleen Fontana, State Registrar

Rhode Island Monthly Vital Statistics Report Provisional Occurrence Data from the Division of Vital Records

Underlying Cause of Death	Reporting Period			
	June 2010	12 Months Ending with June 2010		
	Number (a)	Number (a)	Rates (b)	YPLL (c)
Diseases of the Heart	165	2,284	216.9	3,184.5
Malignant Neoplasms	208	2,301	218.5	6,347.5
Cerebrovascular Diseases	34	476	45.2	680.0
Injuries (Accidents/Suicide/Homicide)	47	657	62.4	10,755.5
COPD	44	515	48.9	577.5

Vital Events	Reporting Period		
	December 2010	12 Months Ending with December 2010	
	Number	Number	Rates
Live Births	949	11,841	11.1*
Deaths	940	9,295	8.7*
Infant Deaths	(6)	(72)	6.1#
Neonatal Deaths	(6)	(66)	5.6#
Marriages	296	6,084	5.7*
Divorces	262	3,310	3.1*
Induced Terminations	256	4,169	352.1#
Spontaneous Fetal Deaths	64	688	58.1#
Under 20 weeks gestation	(59)	(622)	66.9#
20+ weeks gestation	(5)	(66)	5.6#

(a) Cause of death statistics were derived from the underlying cause of death reported by physicians on death certificates.

(b) Rates per 100,000 estimated population of 1,053,209. (www.census.gov)

(c) Years of Potential Life Lost (YPLL).

Note: *Totals represent vital events that occurred in Rhode Island for the reporting periods listed above. Monthly provisional totals should be analyzed with caution because the numbers may be small and subject to seasonal variation.*

* Rates per 1,000 estimated population
\# Rates per 1,000 live births

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Ninety Years Ago, June 1921

Dr. P.E. Truesdale of Fall River, MA, discusses gall bladder disease following a review of 650 operations on the bile passages within his clinic. While he states that he has not uncovered anything new, he feels his observations go far in making clear certain guide posts in the knowledge of gall bladders and bile passages, and that these will help clear up misunderstandings, and move toward a clearer picture of gallstone disease and its treatment.

For the second time in two years, the medical profession has had to take steps in blocking the legislative recognition of chiropractors. "It is humiliating to say the least, for physicians who spend long years in study and hospital experience to be obliged to defend themselves against such quackery... However, for all time doubtless quacks will flourish, for the gullible are always with us."

A small note in the editorials makes mention of a printers' strike, and an "enforced quiescence." Production of the journal has resumed, and one might suppose this is the reason for the relative spareness of the June issue, and why the next issue encompasses July, August, and September, collectively. Rhode Island Hospital ordered a supply of radium with the expectation of delivery by June.

Fifty Years Ago, June 1961

Joseph Oren, MD, Raymond F. McAteer, MD, and Robert E. Serfling, PhD, discuss the Rhode Island poliomyelitis epidemic of 1960, the state's first outbreak in five years. A majority of the 121 cases of diagnosed or suspected poliomyelitis appeared in crowded and low socio-economic areas--particularly housing projects. Studies were conducted on Salk vaccinations in Providence and Pawtucket, and various sewage samples were taken in order to demonstrate the prevalence and spread of enteroviruses in epidemic situations. It's noted that the areas most affected by poliomyelitis were, indeed, lower socio-economic regions which were less well-vaccinated than the upper areas. After looking at the numbers of cases, the areas in which they appeared, and vaccination records, the authors note that the distribution of cases was atypical from previous outbreak patterns, and shorter lived--most likely due to vaccination procedures, although it is also noted that improvement needs to be made to immunize the more susceptible population.

Michael G. Pierik, MD, discusses a number of cases in which Vitamin C deficiency is erroneously referred as arthritis. "A cure of 'arthritis' was possible by a belated recognition of an early symptomatic stage of Vitamin C deficiency. A negative capillary fragility test and absence of gingivitis were noteworthy features.

The American Psychiatric Association releases a statement regarding the practice of hypnosis, noting that it a specialized psychiatric procedure with some value in other areas of medical practice and research, but that little is known of the nature of the hypnotic state and that few reports of controlled experiments into the nature of hypnosis have been published. They follow this with a seven-point list of recommendations in how to regard hypnosis.

Twenty-Five Years Ago, June 1986

Anita B. Lasswell, MS, RD, and Tricia Leddy, MD, RD, take note of the rise of fad diets and nutritional "quackery" and misinformation. The authors discuss strategies in protecting patients from bad information and advice, and what the physician's obligation is in alerting patients to potential dangers such as vitamin and mineral overuse, ergogenic aids, and perilous weight loss plans.

From a speech presented to the Rhode Island Chapter of the American Academy of Family Physicians in April, Senator Claiborne Pell discusses the role of the family practitioner in the modern world. The senator cites the rise in specialization, and the ever-present health care crisis, and praises improvements in health care access to lower-income areas in Rhode Island. One role of the family physician is to contribute to attitudinal changes in the populace toward more healthy lifestyles.

The American College of Emergency Physicians has called for "right to know" laws that will provide workers, communities, and emergency medical personnel with information about poisonous materials in their working or living environment. They note that the majority of health care professionals, including emergency response teams, have little training in the detection of diseases from poisonous or toxic exposure.

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