Resident Work Hours

The Evolution of a Revolution

Marc K. Wallack, MD; Lynn Chao, MD

There is much in common between ancient Greeks and modern surgeons. The word surgery is derived from the Greek word *cheirourgos*, meaning “working by hand.” Ancient Greeks invented the marathon, based on the long run of Phidipedes to announce the progress of the Battle of Marathon. Modern surgeons invented the marathon residency training program. Like ancient Greeks, modern surgeons are under siege themselves, a revolution over residency lifestyle, or more specifically, over work hours. This article is the Phidipedes of surgery, announcing the evolution of this battle over resident work hours. To fully comprehend this revolution, the history of surgical resident training from Halsted to the events of the Libby Zion case, which resulted in the 405 regulations in New York, will be reviewed. The influences that have led to further changes will also be examined. Finally, the task of training residents with reduced work hours, implications of the changes, and thoughts for the future will be discussed.

A SHORT HISTORY

Surgical training has its roots in the barbershops of the world. In the United States, surgical training went from the barbershops to become part of general medical training. It was loosely structured, unregulated, and variable. Students would apprentice themselves to a practitioner for an unspecified number of years. This apprenticeship structure moved into the hospitals in the 19th century but, as described by William S. Halsted1 in a 1904 address at Yale, these students often would spend inadequate time training before completing their apprenticeships to become surgeons themselves. With Halsted’s influence, however, surgical training would change drastically.

Halsted was the chairman of the Department of Surgery at Johns Hopkins University at the turn of the last century. In 1897, he introduced the concept of surgical residency as we know it, based on the original German model conceived by Hermann Boerhaave in the 18th century at the University of Leiden, Leiden, the Netherlands. Halsted promoted several very important concepts and practices in residency training: graded responsibility, a variable and lengthy training period, a pyramidal system of promotion, a resident’s ward service, and, most pertinent to this article, a restrictive lifestyle. This last concept of a restrictive lifestyle meant that residents truly resided in the hospital. They received little or no pay, were discouraged from marriage, and worked 24 hours a day, 7 days a week, 365 days a year.

See Invited Critique at end of article

At first, the Halstedian model was more the exception than the rule but gradually became more common, especially after World War II when more surgeons wanted to be trained and certified for both the prestige and financial rewards. This increase in the number of formally trained surgeons also lead to modifications of the original training model in that the time required to graduate was shortened and pyramids were eliminated. Furthermore, the advent of Medicare and Medicaid abolished the concept of the ward service, and, significantly, the lifestyle became less restrictive—marriage was not forbidden, the pay improved, and duty was no longer 24/7, although hours still remained long and grueling. These modifications lead to the more modern picture of the surgical

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residency known up until the late 1980s. However, a tragedy would occur in the mid-1980s which would lead to a force that changed everything for the new century.1-5

LIBBY ZION AND THE BIRTH OF THE 405 REGULATIONS

On March 5, 1984, a monumental event occurred that affected the course of surgical residency training. On that morning, Libby Zion died. Ms Zion, an 18-year-old college student, was taken to the emergency department of a prominent New York City teaching hospital by her parents who reported fever, shaking chills, and dehydration. She was evaluated only by junior medical residents and was believed to have a viral syndrome. She was admitted for observation and workup after telephone consultation with the medical attending. The controversies that surrounded the case included the residents’ awareness of her phenerazine use, the status of her illicit drug intake, particularly cocaine, and the residents’ knowledge of drug interactions. Once admitted to the hospital, Ms Zion was prescribed multiple medications throughout the course of the night to treat her fever and anxiety. Among these medications was meperidine, which is contraindicated with phenerazine. She also was restrained for self-protection. A medical intern who was covering multiple wards and who, at that point, had been awake for more than 18 hours gave many of the orders over the telephone without consultation with the medical attending. Ms Zion initially seemed to respond to treatment but, early in the morning, she became more febrile and agitated. At 6:30 AM, she arrested and died. The Medical Examiner Report listed the cause of death as bilateral bronchopneumonia. It went on to say that the patient had high fever and sudden collapse following the injections of meperidine and haloperidol. The evidence of cocaine intake was inconclusive.6

In most instances, this case, although extremely tragic, would not have gone further than a civil malpractice suit. However, this patient was the daughter of Sidney Zion, a noted New York City newspaper columnist and former federal prosecutor. Zion was so grieved and outraged by the death of his daughter that he hired private investigators and physician experts to review the course of events. They concluded that Libby’s death had been the result of errors in medical care. Armed with this information, Zion, acting as a father, filed a civil malpractice suit.1 Furthermore, and more importantly to residency training, he successfully pressured Manhattan District Attorney Robert Morgenthau to convene a grand jury that would investigate these matters.7 The grand jury report and issued its endorsement of all 5 recommendations in June 1987. It delineated its own specific proposals including limiting nonemergency department resident work hours to 16 consecutive hours with 8 hours off between each shift.7 That August, in recognition of the immense burden that would be placed on the New York Health Care System by these proposed regulations, the Ad Hoc Committee heard testimony on the effects of the proposal from several agencies including the American College of Surgeons, the Accreditation Council for Graduate Medical Education (ACGME), the Committee of Interns and Residents, and the Greater New York Hospital Association. Significantly, the Greater New York Hospital Association reported that more physician and ancillary support would need to be hired by the New York Health Care System to comply with the proposal. The Greater New York Hospital Association estimated the cost to be an additional $203,955,001 per year.8 This information led the Ad Hoc Committee to modify its original recommendations in October 1987 to help reduce costs.7

For surgeons, the most significant of these modifications was that:

Individual residents who have direct patient care responsibilities other than in the Emergency Department shall have a scheduled work week which will not exceed an average of 80 hours per week over a 4-week period and should not be scheduled to work as a matter of course for more than 24 consecutive hours, with one 24-hour period of non-working time per week...7(p773)

Of note, the 16-hour shift limit of the original June 1987 recommendations had been increased to 24 hours, although still with 8 hours in between.7

Five prominent New York chairmen of surgery at the time, Arthur Aufses, MD, Mount Sinai Medical Center, Bernard Jaffe, MD, SUNY–HSC Brooklyn, Keith Reemsta, MD, Columbia University, Seymour Schwartz, MD,
University of Rochester, and Frank Spencer, MD, New York University, recognized that the effect on surgery resident training would be enormous despite the October modifications. They met with Dr Axelrod to discuss their concerns. Dr Axelrod acknowledged these concerns and a surgical waiver was developed that stated the following:

On-call duty . . . by trainees in surgery shall not be included in the 24-hour limit . . . and the 80-hour limit . . . IF:

- the hospital can document that during such night shifts, trainees are generally resting and that interruptions for patient care are infrequent . . .
- such duty is . . . no more often than every third night
- a continuous assignment that includes . . . on call duty is followed by a nonworking period of no less than 16 hours and
- procedures are implemented to relieve a trainee . . . when fatigue is due to an active on call. 9

As a result of the waiver, on-call duty by surgery residents would not be counted in the time limits if the stated criteria were met as it was believed that surgical residents would be able to sleep on call when not operating, unlike medical residents who were burdened with numerous, arduous admissions. The definition of “generally resting” was left very open and at the discretion of the hospital. These provisions were accepted by both sides and incorporated into the 405 regulations.

Thus, on July 1, 1989, 5 years after Libby Zion’s death, section 405.4 of title 10 of the New York Codes, Rule and Regulations of the Department of Health, more commonly known as the Bell regulations, was put into action (Table). 9 Two hundred million dollars to hire additional ancillary help and board-certified physicians was provided in the law to assist New York hospitals in compliance. Hospitals were required by law to hire the additional ancillary services by January 1989. 10-13

REATIONS

The reaction to these regulations from all arenas was loud and fierce. The worries of compromised patient care, lack of continuity, lack of commitment to patients, and cost to the medical system were loudest among the concerns. First, the medical community, particularly the governing bodies of education, began to issue objections and recommendations. Among the most important medical organizations was the Association of American Medical Colleges that raised the following 4 objections to the regulations: (1) lack of recognition of differences in specialties, (2) potential effect on length of residency, (3) potential effects on hospital costs, and (4) potential effects on long-term physician manpower supply. The Association of American Medical Colleges issued their own recommendations that endorsed the work hours limitation, the surgical exemption, and the increased supervision but called for more deliberation on the effects of these changes on all aspects of residency training and asked for increased input from those directly involved and for more gradual implementation. 3,12,14

The ACGME also developed a set of recommendations to be incorporated into the General Requirements for Program Accreditation. It generally concurred with the Association of American Medical Colleges (agreeing with more nonworking time) but also provided for individual specialty exemptions if recommended by that specialty’s Residency Review Committee and approved by the ACGME. It additionally emphasized the maintenance of continuity of care and program authority. However, the ACGME purposely did not give a number limit to work hours. These recommendations were then sent to the ACGME-sponsoring organizations for ratification, including the American Board of Medical Specialties. The American Board of Medical Specialties proved to be the roadblock to the ratification of the ACGME recommendations owing to the objections of the surgical boards. The surgeons believed that the limited call of every third night and 24 hours off per week would corrupt the continuity of care and the educational experience of residents. The surgical arm also did not believe that the specialty exemptions in the ACGME requirements would be sufficient to accommodate surgical training. Therefore, the American Board of Medical Specialties submitted alternative, less restrictive phrases of prohibiting “excessive prolonged periods of duty” and allowing “adequate opportunities to rest and study.” It also gave the individual institutions the responsibility to monitor compliance. The vagaries of the wording were met with objections from the Association of American Medical Colleges. The surgeons were uniformly criticized for their stance. Other organizations made various proposals but, to date, there is still no official policy from the ACGME delineating specific resident work hour limits. 11,14,15

On the level of individual physicians, the debate also raged. The literature contained letters and commentaries on the issue. Both surgeons and nonsurgeons objected. Concerns about physician work ethic and physician responsibility were raised. 16-23 In one article, Reiner noted that there was no evidence in the literature to correlate resident sleep and quality of care. Even residents affected by the regulations added their dissenting voices. Amy L. Bloch, a new nonsurgical intern at a New York City Hospital, complained about the rigidity of the regulations. 24 Michael T. Harris, a New York City surgical resident, at a conference at the New York Academy of Medicine, believed that “the fostering of commitment, that is the goal most severely jeopardized by the 405 regulations.” 26(p366) However, Bell continued to criticize the medical community for failing to embrace his namesake regulations. He took particular aim at the surgeons, stating...
that it was "sad to note that the surgical program directors in New York are not complying with their modifications ..." 27(p186) and that "surgeons, by insisting on the use of 'wiggle words' ... really do not mean what they say." 28(p255)

The public reacted to the regulation and its compliance as well, although with a differing view from that of most of the medical community. Echoing Bell's position, the public was louder, more vocal, and more influential than the medical community. In 1994, Mark Green, New York City's Public Advocate and another mayoral hopeful, published a 102-page study titled, "For Whom the Bell Tolls: How Hospitals Violate the 'Bell' Regulations Governing Resident Working Conditions." It was an investigation into the compliance of various New York City Hospitals with the Bell regulations in 1992 and 1993. It concluded that Bell regulation violations were widespread and that this directly compromised patient care. Green called on the Department of Health (DOH) to enforce the Bell regulations more seriously. Green issued a follow-up report in 1997 titled, "Putting Patients at Risk: How Hospitals Still Violate The 'Bell' Regulations Governing Resident Working Conditions." 29 This report was allegedly prompted by patient complaints and by adverse incident reports filed to the DOH. Department of Health documents related to investigations that arose from these adverse incidents were reviewed. Green contended that, of 50 New York City hospitals investigated by the DOH for adverse incidents from January 1995 through August 1997, approximately 50% were violating Bell regulations. Green blamed the adverse incidents on poor resident supervision and excessive resident work hours and stated that hospitals were avoiding investigations by underreporting adverse incidents. He also attacked New York Governor George Pataki and then Health Commissioner Barbara DeBuono for being too soft and for allowing self-monitoring. He pointed out that the hospitals had received $1.2 billion over 7 years to assist in Bell regulation compliance. 30 This second report was touted in the headlines of all major papers in New York City along with horror stories of tired residents. 30,31 Green was quoted by the Daily News as saying that New York hospitals were "playing roulette with people's lives." 32

Owing to public outrage, the DOH initiated surprise visits of 12 New York hospitals from March 1, 1998, through March 5, 1998. This was a fact-finding mission only with no official penalties. The results, issued in May 1998, stated that all 12 hospitals consistently broke the Bell regulations, especially surgical training programs. This was again printed in all New York papers, prominently displayed in their headlines. 33-37 However, the fact that there were no mistakes that jeopardized patient care made by overworked residents was relegated to the smaller print. 37

Cries for stiffer penalties and closer monitoring were raised. Calls for the revocation of physician licenses for work hour violations were made. The DOH expressed its concern and followed up on their findings with visits to various New York hospitals with surprise audits through the remainder of 1998. But, unlike the initial set of DOH raids, penalties were issued to noncompliant hospitals. Five institutions were slapped with fines ranging from $14000 to $20000 at $2000 per citation. Even more devastating for the hospitals was that the DOH made a press release for each hospital. Exact citations were listed and surgical training programs ranked as the biggest offenders. 38,39

Public outcries grew even louder when, in January 1999, a cardiology resident was killed in an automobile accident while driving to take his board examinations after a night on call. The Committee of Interns and Residents immediately held a conference the following month to draw attention to the issue of work hours and to call on Governor Pataki and the New York State Legislature to enforce work rules and toughen penalties. Bell and Green were among those in attendance. This led to more fodder for the media with headlines again screaming of horror stories about sleep-deprived residents. 33,34 Brooklyn District Attorney Charles Hynes reacted to the media attention by announcing that he would prosecute any case in Brooklyn in which a patient suffers because of overworked physicians. 35 The hospital involved could be charged with assault, negligent homicide, or even manslaughter. Sidney Zion also sharpened his sword and blasted the arrogance of physicians for using continuity of care as an excuse to overwork residents and of public officials for not enforcing the law that resulted from his daughter's death. 36

The culmination of the public attention was that Pataki signed the Health Care Reform Act 2000 into law. As part of Health Care Reform Act 2000, new requirements on hospitals' compliance with the Bell regulations and greater penalties for noncompliance were incorporated. One hundred sixty-eight million dollars were allocated for this crackdown. More site visits were promised. No modifications to the original Bell regulations were made. 37

COMPLIING WITH 405

The ramifications of the Bell regulations on the individual hospitals and programs are significant. Programs must both train surgery residents and stay compliant. The New York surgery programs are addressing this 2-fold challenge. There are many tools that can be used to implement compliance. One of these is the use of physician extenders including physician's assistants, nurse practitioners, and nonresident physicians. These personnel help fill the call schedule and cover for the absence of residents. Although the argument is that this detracts from the resident experience, this has not yet proven to be the case. 18,22 Another tool to aid in compliance is to permit surgical residents to cross-cover services. Unlike the past when an on-call resident team would only cover their own patients, the on-call team now covers all patients. This detracts from continuity of care and the physician-patient ratio at night and on weekends but allows the number of calls to be manageable at every third night. A final tool is the use of the computer. Films, laboratory studies, and medical records can be accessed through a single workstation. A resident no longer needs to run all over the hospital to collect information, write progress notes, or enter orders that greatly decreases work time.

To ensure that compliance to these regulations is internally monitored by the hospital, Greater New York Hospital Association developed some recommen-
The debate over resident work hours continues, especially concerning the consistency in the medical literature. The debate over resident work hours may be merely a passing fad limited to New York rather than a legitimate, persistent national issue. However, this issue clearly has become important nationwide. The force that arose through the tragic death of Libby Zion in New York City almost 2 decades ago is still gathering steam. The public has clearly demanded that resident work hours be addressed, specifically in surgery and especially in the current environment of examining medical mistakes. The future medical community, namely, the medical students and residents, has also demanded that this issue be addressed. The American Medical Association–Medical School Section passed a resolution in 2000 supporting reductions in work hours using the New York model. They resolved to “actively advocate for the establishment of state regulations that set standards for resident work hours and conditions with stronger penalties for violations, using the New York State regulations as a model”43 and to “actively work . . . to establish resident work hour and condition limits for all specialty residency programs and to develop stronger and more effective enforcement of these limits through new or existing mechanisms.”55 The students backed up their statements regarding work hours loudly with the 2001 match. There were 68 unfilled categorical surgery positions in 40 programs. This was 10 times the average for the last 10 years. In comparison, the less time demanding, lifestyle-friendly specialties did very well. Dermatology had no unfilled spots. Radiology and anesthesiology, which were specialties that were doing poorly in their matches over the last few years, also made strong comebacks.

Most recently, the public and some members of the medical community have joined together as one powerful force to seek further government involvement. On April 30, 2001, a petition was filed with the Occupational Safety and Health Administration by a conglomerate of advocacy organizations, which included the Committee of Interns and Residents, Public Citizen, Service Employees International Union, and American Medical Student Association, and by Drs Bell and Kingman Strohl, director of the Center of Sleep Disorders Research, Case Western Reserve University, Cleveland, Ohio. The petitioners requested that Occupational Safety and Health Administration adopt federal guidelines similar to those of New York state regulations that set standards for resident work hours and conditions with stronger penalties for violations, using the New York State regulations as a model.43,44

Most significantly, the petitioners cited the risks of long hours to both patients and residents. They also criticized the ACGME standards for being voluntary and weak.54

Current Opinions

With all of the changes surrounding resident working hours, current opinions have not changed significantly in the medical literature. The debate over resident work hours continues, especially concerning the consistency of care, which is the foundation of the physician-patient relationship, and the readiness of residents to face the realities of surgical practice.19,30 The executive director of the American College of Surgeons recently wrote: “Constrained work hours do not prepare residents for the real world of surgical practice.”51(p5) On the other hand, public perception has improved as evidenced by a recent article in the New York Post, which wryly pointed out that residents are no longer the “young and the restless.”52

Many surgeons across the country still hope this interest in work hours may be merely a passing fad limited to New York rather than a legitimate, persistent nationwide issue. However, this issue clearly has become important nationwide. The force that arose through the tragic death of Libby Zion in New York City almost 2 decades ago is still gathering steam. The public has clearly demanded that resident work hours be addressed, specifically in surgery and especially in the current environment of examining medical mistakes. The future medical community, namely, the medical students and residents, has also demanded that this issue be addressed. The American Medical Association–Medical School Section passed a resolution in 2000 supporting reductions in work hours using the New York model. They resolved to “actively advocate for the establishment of state regulations that set standards for resident work hours and conditions with stronger penalties for violations, using the New York State regulations as a model”43 and to “actively work . . . to establish resident work hour and condition limits for all specialty residency programs and to develop stronger and more effective enforcement of these limits through new or existing mechanisms.”55 The students backed up their statements regarding work hours loudly with the 2001 match. There were 68 unfilled categorical surgery positions in 40 programs. This was 10 times the average for the last 10 years. In comparison, the less time demanding, lifestyle-friendly specialties did very well. Dermatology had no unfilled spots. Radiology and anesthesiology, which were specialties that were doing poorly in their matches over the last few years, also made strong comebacks.

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Sample timesheet. The resident must fill each hour box with one of the following codes: PC, indicates patient care; TT, transition time (sign out rounds); RE, required educational activities; VE, voluntary educational activities; TO, time off; HC, home call (call taken from outside the hospital walls; not counted into total unless returns to the hospital); OCR, on-call resting (any time on-call rest is uninterrupted); OCI, on-call interrupted (any time on-call rest is interrupted by patient care); and MA, moonlighting activities.

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The ACGME responded to these criticisms on its Web site in May 2001 by pointing to the need for a more comprehensive approach to addressing work hours in the context of medical education and patient safety. This recognition by the ACGME, however, illustrates the importance that the ACGME places on modification of work hours.\textsuperscript{15} The conclusion is that the work hours issue is a national issue that is here to stay. The medical students, the residents, the public, and the governing bodies of medical education have all kept it in the spotlight. Referring back to the ancient Greeks, surgeons must learn from their mistakes and end all similarities with them. The ancient Greeks bickered among themselves and ultimately allowed outsiders like the Romans and the Goths to take over their empire. If surgeons continue internal arguments over where to side in the resident work hours revolution, outside forces like Bell, the DOH, and Occupational Safety and Health Administration will invade the profession and take control. The leaders in surgery must take the reins of the speciality and assume responsibility for protecting its foundations. They must recognize that responding to work hours in a positive fashion will only attract better-quality residents, engender public trust, and stave off more outside influences. They must search for ways to continue the same high standards of surgical education that Halsted introduced at the beginning of the 20th century into the 21st century. Only then can this revolution over resident work hours end and the future of surgical training be assured.

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REFERENCES


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The article by Drs Wallack and Chao is an accurate chronicle of public policy and politics in New York. The authors are supportive and justify their position by using recent resident-match results as evidence for a controllable lifestyle agenda. Still, training residents to provide surgical care now requires a fundamental change in vision and activity that involves more than limiting working hours. The real issues are service and training, supervision and communication.

In our experience, compliance requires controlled management of the clinical experience with specific goals and sufficient personnel to meet patient needs. The surgical waiver is limited by the vagueness of the definition of the words “generally resting,” the difficulty in documentation of resident activity, and the adequacy of the methodology for seeking relief. This may provide a loophole in some circumstances but does not withstand scrutiny.

Success is based on prioritizing resident activity. It is limited by the ability to identify and use midlevel health care providers who make service teams more complex and increase the burden of communication. Working hour regulations shift responsibility to the attending surgeon by taking the resident out of the communication loop on a regular basis. This and the ambulatory nature of modern surgical practice challenge time management pressures and continuity of care. Moving the care of many surgical patients out of the hospital increases the criticality of the hospitalized patients.

In New York, the regulations are forcing change. Career dynamics in student selection is important. Still, these are superficial justifications for change. Few training programs have a regulatory mandate for compliance with enforcement potential. Cooperation, time management, team communication, prioritization of activity, and focusing on specific outcomes that are evidence-based result in an improvement in both care and training found in Halsted’s original vision.

At the State University of New York at Buffalo, we have revised our program so as to be totally 405 compliant. The greatest burden falls on the attending staff; the residents are made to understand that compliance is not optional. Although contact time with the residents is significantly reduced (925 net contact days of 1825), we have not observed a difference in exceptional patient care needs, residents have at least 1 day out of 7 free of routine responsibilities and be on call in the hospital no more often than every third night. During these on-call hours residents should be provided with adequate sleeping, lounge, and food facilities. There must be adequate backup so that patient care is not jeopardized during or following assigned periods of duty. Support services must be such that residents do not spend an inordinate amount of time in non-educational activities that can be discharged properly by other personnel.

Different specialties and different rotations may require different working hours and patterns. A distinction must be made between on-call time in the hospital and on-call availability at home and their relation to actual hours worked. The ratio of hours worked to on-call time will vary, particularly at the senior levels and therefore necessitates flexibility.

Residency training in surgery is a full-time responsibility; activities outside the educational program must not interfere with the resident’s performance in the educational process, as determined by the program director, nor must they interfere with the residents’ opportunities for rest, relaxation, and study.

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