

**Resident Work Hour Restrictions in the United States: Impact, Adjustments, and Barriers to Change**

Atul Grover, MD, PhD(c) and Shamiram Feinglass, MD, MPH

Teaching hospitals in the United States rely heavily on almost one hundred thousand resident physicians for delivery of patient care in return for training and education. These physicians have historically worked eighty to one hundred hours per week or more for stipends which do not always cover their cost of living. While the state of New York implemented regulations to limit resident work hours over a decade ago, 2003 marks the beginning of a new phase in graduate medical education in the U.S.; the Accreditation Council for Graduate Medical Education's (ACGME) restrictions on resident hours will pose new challenges for both educators and financial managers in more than one thousand teaching hospitals. While many stakeholders applaud the promise of improved patient care and less fatigued doctors, others lament the loss of rigorous training schedules. Some question the impact of work hour limits on continuity of patient care and the effect it will have on residents' exposure to diverse and difficult cases. Though some specialties and individual programs have already limited resident work hours, the greatest challenges appear to be for surgical programs, whose guidelines have historically allowed for work hours well above the 80-hour limit, even in New York. The authors review the new guidelines, evidence of their potential impact on patient care, resident education, and the clinical workforce for teaching hospitals, and the barriers to future implementation and assessment.

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**Overview**

There are almost 100,000 interns and residents (house staff) training in US teaching hospitals. These physicians have completed four years of undergraduate medical education (UME) and are being trained in a chosen specialty for at least three years (as many as eight for initial specialization) under the supervision of attending or supervising physicians. Most teaching hospitals are affiliated with medical schools and larger universities that help in creating and maintaining a training program which is overseen by specialty boards and accreditation committees such as the Accreditation Council for Graduate Medical Education (ACGME).

Programs of Graduate Medical Education (GME), commonly known as residencies, were not always part of US physician education. At the turn of the twentieth century, advancements in medicine became much more rapid, particularly in the areas of surgery and the development of antibiotics; the first two decades saw substantial increases in the number of hospitals and a growth in the complexity of their organization.<sup>1</sup> Specialties emerged because of the rapidly increasing knowledge base that was difficult for any one person to master.<sup>2</sup> This increased focus on specialty care changed the nature of post-graduate training for physicians who, up until that time, had generally been trained through apprenticeships of one or two years.

Graduate medical education quickly became more of the rule than the exception, and by 1940, the American Medical Association (AMA) began to classify physicians according to skills and performance. These programs were largely based upon the prototypes set up by the Johns Hopkins University and the Mayo Clinic (through the University of Minnesota).

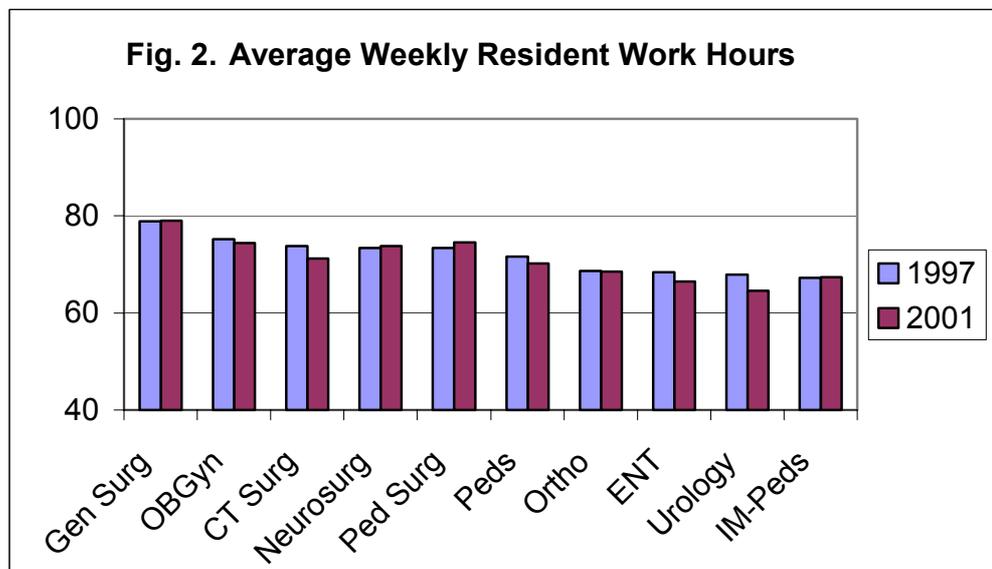
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<sup>1</sup> Starr, Paul. 1982. *The Social Transformation of American Medicine*. Basic Books

<sup>2</sup> Stevens, Rosemary. 1998. *American Medicine and The Public Interest*. University of California Press: Berkeley.

Residents have historically been seen as a combination of student and employee: analogous to “apprentices,” whose work hours were not subject to standard labor laws of the United States because of their status as paid learners. However, a ruling by the National Labor Relations Board (NLRB) signaled changes in this perception in 1999, allowing house staff to organize and participate in collective bargaining similar to those in other professions.<sup>3</sup>

Resident program survey data suggests that, while the average resident works sixty hours per week, many specialties, particularly the surgical disciplines, routinely subject residents to working seventy hours a week or more, and wide variations exist.<sup>4</sup> (FIGURE 1) Residents in several specialties, such as pediatrics and internal medicine, may remain on duty for more than thirty hours at a stretch. These periods typically occur when a resident is “on-call”, working an entire day and night, and then a period of time the following day until work is completed or responsibilities are passed on to other residents.



Not all on-call activity is patient-related, nor is it entirely educational. Surveys and observational studies of internal medicine and pediatric residents during night call

<sup>3</sup> American Medical News, “Residents are employees, NLRB rules.” [http://www.ama-assn.org/sci-pubs/amnews/pick\\_99/prfa1220.htm](http://www.ama-assn.org/sci-pubs/amnews/pick_99/prfa1220.htm) Accessed 7/26/03

<sup>4</sup> Brotherton SE, Simon FA, Etzel SI. US graduate medical education, 2001-2002: changing dynamics. JAMA. 2002 Sep 4; 288(9):1073-8.

demonstrate that a significant percent (40-50%) is spent sleeping, eating, or in other basic activities; documentation and chart review account for over a third of night time activity.<sup>5</sup> Residents activities within a program vary; some sleep less and perceive that they work harder, which may be due to personal inefficiencies.<sup>6</sup>

While medical education and residency have changed over the last century, traditions were set early. In surgery, for instance, the “resident” concept originally meant that residents “received little or no pay, were discouraged from marriage, and worked 24 hours a day, 7 days a week, 365 days a year.”<sup>7</sup> After World War II, significant modifications were made to training, though work hours were well beyond that of most other professionals.<sup>8</sup> Residents in some programs have continued to work 60 to 84 consecutive hours, from a Friday through Monday morning<sup>9</sup>—longer than an entire workweek in some European nations.

Residency and the process of medical education has been historically unregulated by public entities, though several peer groups have been formed to set standards. The Liaison Committee on Medical Education (LCME) accredits 126 schools engaged in allopathic undergraduate medical education (UME) and is sponsored by two non-profit organizations: the Association of American Medical Colleges (AAMC) and the American Medical Association (AMA). The LCME also works with a Canadian sister organization to accredit the 16 schools of medicine in Canada.<sup>10</sup> The Accreditation Council on Graduate Medical Education (ACGME) accredits residency programs in 110 specialty and subspecialty areas of medicine, including all programs leading to primary Board certification by the 24 member boards of the American Board of Medical Specialties

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<sup>5</sup> Moore SS, Nettleman MD, Beyer S, Chalasani K, Fairbanks RJ, Goyal M, Carter M. How residents spend their nights on call. *Acad Med*. 2000 Oct; 75(10):1021-4.

<sup>6</sup> Tanz RR, Charrow J. Black clouds. Work load, sleep, and resident reputation. *Am J Dis Child*. 1993 May; 147(5):579-84.

<sup>7</sup> Wallack MK, Chao L. Resident work hours. *Arch Surgery*. 2001 Dec; 136(12):1426-31

<sup>8</sup> Organ CH. Comment on Wallack and Chao, 2001; 1432.

<sup>9</sup> Czeisler CA et al. Comment on Strub 2002. *JAMA* 2002; 287(14):1802-3.

<sup>10</sup> Liaison Committee on Medical Education website. [www.lcme.org](http://www.lcme.org) access 7/25/03.

(ABMS). Twenty-six Residency Review Committees (RRC) set standards for accreditation within specialties.<sup>11</sup>

### **State of Change: New York and Libby Zion**

In 1984, an 18-year-old woman named Libby Zion, daughter of a prominent columnist and former federal prosecutor, died after being inappropriately treated by a medical resident at a New York City teaching hospital.<sup>12</sup> The civil malpractice suit that followed resulted in a grand jury report criticizing the system of medical training in the US. This criticism led to the eventual release of the “Bell regulations” (named after the special commission’s head, Bertrand Bell) in 1989; these modifications to section 405 of the City’s Codes required a no-longer-than 80 hour work week, no more than 24 hours of consecutive duty, 8 hour non-working periods between shifts, and at least 24 consecutive hours off duty each week<sup>13</sup>. Surgical trainees were granted a waiver from the NY state regulations if they could document that residents were resting during the majority of night call and that call was limited to every third night. These provisions were not part of the original regulations but were adopted “following consultation with a group of prominent surgeons.”<sup>14</sup>

Contrary to the fears of many residency program directors and hospitals, efforts to exert control over the work hours of physician trainees did not appear in other states nor at the national level for more than a decade. In 1999, the Institute of Medicine (IOM) report, *To Err is Human*, brought patient safety issues to the forefront of national attention. One of the IOM committee’s recommendations to improve patient care in the U.S. was an examination of the relationship between resident fatigue and patient care errors.<sup>15</sup> This recommendation occurred in the same year as the NLRB’s decision allowing residents to

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<sup>11</sup> Accreditation Council on Graduate Medical Education website. [www.acgme.org](http://www.acgme.org) accessed 7/25/03.

<sup>12</sup> Wallack MK, Chao L. Resident work hours. *Arch Surgery*. 2001 Dec; 136(12):1426-31.

<sup>13</sup> *Hospitals—Minimum Standards*, Chapter V, Subchapter A, Article 2, part 405. [www.health.state.ny.us/nysdoh/rules/405.htm](http://www.health.state.ny.us/nysdoh/rules/405.htm). Accessed 7/28/03.

<sup>14</sup> Johnson T. Limitations on residents' working hours at New York teaching hospitals: a status report. *Acad Med*. 2003 Jan; 78(1):3-8.

<sup>15</sup> *To Err Is Human: Building a Safer Health System*. Linda T. Kohn, Janet M. Corrigan, and Molla S. Donaldson, Editors; Committee on Quality of Health Care in America, Institute of Medicine. September 1999.

collectively bargain. Public perception was again focused on resident work hours, this time as a potential threat to patient safety across the country.

In 2001, Public Citizen, a leading U.S. consumer advocacy group, petitioned the Occupational Health and Safety Administration (OSHA) for new federal regulation of resident work hours. The petition requested caps of 80 hours per week and shifts of no longer than 24 hours, similar to the Bell regulations in New York. While OSHA declined to issue such regulations, movement towards limiting resident work hours continued, including introduction of national legislation to limit resident work hours.<sup>16</sup>

Federal regulation was widely decried by medical educators. By 2001, the Association of American Medical Colleges (AAMC) had called for voluntary restrictions on resident work hours similar to New York's, and the ACGME formed a Work Group to examine the issue. The ACGME vetted the recommendations of its Work Group through Fall of 2002, and by February 2003 issued its own guidelines; these guidelines, while not legally mandated, effectively forced changes in resident work schedules as of July 2003 because of their requirement in maintaining accreditation.<sup>17</sup> The limitations imposed by the ACGME include:

- ◆ No more than 80 duty hours per week, averaged over four-week period;
- ◆ One day in seven free of patient care responsibilities, averaged over four-week period;
- ◆ In-house call no more frequently than every third night, averaged over four-week period;
- ◆ A 24-hour limit on in-house call duty, with an added period of up to 6 hours for inpatient and outpatient continuity and transfer of care, educational debriefing and didactic activities; no new patients may be accepted after 24 hours;
- ◆ A 10-hour minimum rest period should be provided between duty periods;
- ◆ When residents take call from home and are called into the hospital, the time spent in the hospital must be counted toward the weekly duty hour limit.<sup>18</sup>

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<sup>16</sup> van Steenburgh, J. "Under pressure, medicine revisits resident work hours." Accessed 5/29/03 at <http://www.acponline.org/journals/news/mar02/resident.htm>.

<sup>17</sup> Dunn, M. "The new ACGME duty hour standards and their implementation." Presentation to the Council on Graduate Medical Education, April 10, 2003. Bethesda, MD.

<sup>18</sup> Accreditation Council on Graduate Medical Education. <http://www.acgme.org/DutyHours/wkgroupreport611.pdf> Accessed 5/30/03.

### Impact of Resident Work Hour Limitations

Arguments for and against the limitation of resident work hours are made on behalf of three major stakeholders: resident physicians, patients, and hospitals. Most of these arguments rely on anecdotal evidence or limited surveys, and a paucity of direct, conclusive evidence to support either side. However, most realize the potential for significant impact on the nation's health care delivery system given the significant role residents play and the fact that they represent about one in seven physicians in the U.S.<sup>19, 20</sup> (FIGURE 2)

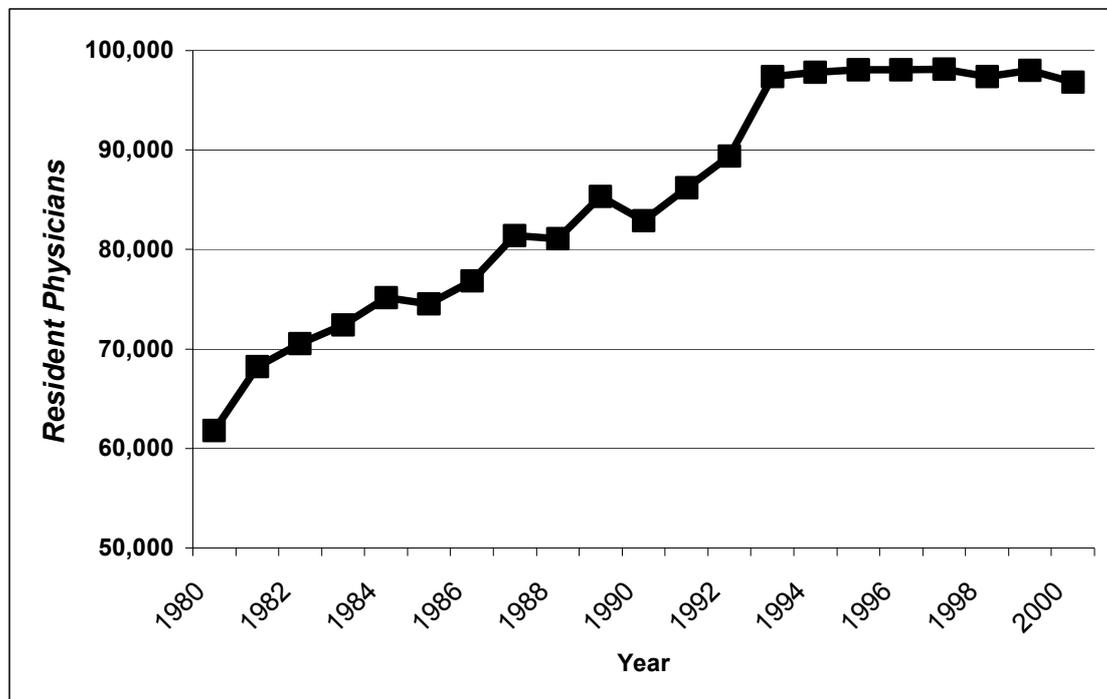


Figure 2. Growth in Resident Physicians, 1980-2000<sup>21</sup>

Major changes in residency programs are not expected for most medical specialties which already have limits imposed by their respective RRCs. However, surgical programs, which have had the most flexible hours and least absolute restrictions, are expected to

<sup>19</sup> Brotherton 2001.

<sup>20</sup> Dunn MR, Miller RS, Richter TH. Graduate Medical Education, 1997-1998. *JAMA* 1998; 280:809-12.

<sup>21</sup> Brotherton 2001.

have the most difficulty in adjusting their curricula and service delivery to the ACGME mandated changes.<sup>22</sup>

### Quality of Patient Care

The link between extended resident work hours and poorer patient care made by the IOM was embraced by many, even within academic medicine.<sup>23</sup> However, others have argued that limits to working hours leads to a shift-work mentality detrimental to continuity of patient care and the production of “ill-equipped” physicians.<sup>24, 25</sup> Little evidence exists as to the actual impact on the quality of patient care in teaching hospitals. Some have suggested that studies linking quality of care to the ratio of nurses to patients might extend to residents; that is, effectively decreasing the amount of time residents care for patients may jeopardize their quality of care.<sup>26, 27</sup>

Most information related to resident fatigue and patient care comes from limited surveys dealing with residents’ own perceptions of safety. Resident physicians have implicated fatigue as a major reason for impaired judgment and frank medical errors.<sup>28, 29, 30</sup> Direct evidence linking fatigue to measurable errors in the field of medicine is lacking. Though the New York regulations have been in place for over a decade, no data linking quality and resident work hours has been collected.

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<sup>22</sup> Weinstein DF. Duty hours for resident physicians--tough choices for teaching hospitals. *NEJM*. 2002 Oct 17;347(16):1275-8.

<sup>23</sup> UCSF resident work hours improvement project approved by GMEC 4/16/01. <http://www.som.ucsf.edu/som/education/gme/workhrs.asp> accessed 5/30/03.

<sup>24</sup> Strub WM. Current resident work hours: too many or not enough? *JAMA*. 2002 Apr 10;287(14):1802; author reply 1802-3.

<sup>25</sup> Pope J. “Hospitals face limit on residents’ hours.” Associated Press. <http://www.body1.com/news/index.cfm/2/7327/1> accessed 6/30/03.

<sup>26</sup> Needleman J, Buerhaus P, Mattke S, Stewart M, Zelevinsky K. Nurse-staffing levels and the quality of care in hospitals. *NEJM*. 2002 May 30;346(22):1715-22.

<sup>27</sup> Weinstein 2002.

<sup>28</sup> Wu AW, Folkman S, McPhee SJ, Lo B. Do house officers learn from their mistakes? *JAMA*, 1991; 265: 2089-94.

<sup>29</sup> Daugherty SR, Baldwin DC, Rowley BD. Learning, satisfaction, and mistreatment during medical internship: a national survey of working conditions. *JAMA*, 1998; 279: 1194-99.

<sup>30</sup> Niederee MJ, Knudtson JL, Byrnes MC, Helmer SD, Smith RS. A survey of residents and faculty regarding work hour limitations in surgical training programs. *Arch Surg*. 2003 Jun;138(6):663-9.

Some evidence and experience can be obtained from the New York State experience. However, much of the data gained from that experience may not be representative of the impact of successful modification of resident training; in 1998, an unannounced investigation of twelve New York hospitals found that all were consistently in violation of the work hour regulations. In a larger examination of hospitals, 54 out of 82 were found in violation of the duty hours regulations.<sup>31</sup>

### Quality of Physician Education

Decreasing the hours worked by residents has been argued to increase their acuity and allow for improved learning; that is, happier, well-rested residents are better learners.<sup>32</sup> However, physician educators, particularly in the procedurally based surgical specialties, have argued that fewer hours in the hospital amounts to fewer opportunities for learning and less experience.<sup>33</sup> However, not all work leads to educational opportunities; as one European observer noted:

There is an obvious conflict between service and training: many trainees' hours are used by being on-call residents in wards and in ICU's, with poor or no supervision; many other hours are spent in administrative work. This is a weak form of training. Avoidance of too many on-calls could save time for the trainees to be used in high-value structured training...It is not enough just discussing working hours, their educational content is more important.<sup>34</sup>

Again, New York offers little insight into the educational impact of work hour limitations, partly due to lack of data but also due to the exclusion from work hour limits granted to surgical training programs.<sup>35</sup>

Interviews and surveys have indicated that, while formal educational opportunities may not change, residents do report increased reading, self-learning (outside the hospital), and

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<sup>31</sup> Dunn MR. 2003.

<sup>32</sup> UCSF resident work hours improvement project approved by GMEC 4/16/01.  
<http://www.som.ucsf.edu/som/education/gme/workhrs.asp> accessed 5/30/03.

<sup>33</sup> Barden CB, Specht MC, McCarter MD, Daly JM, Fahey TJ 3rd. Effects of limited work hours on surgical training. *J Am Coll Surg.* 2002 Oct;195(4):531-8.

<sup>34</sup> Lazarides MK, Polychronidis A, Simopoulos CE. Effects of limited work hours on surgical training: a European aspect. *J Am Coll Surg.* 2003 Apr;196(4):661-2.

<sup>35</sup> Johnson 2003.

higher satisfaction with fewer hours.<sup>36, 37</sup> Residents' perceptions of the educational impact of work hour restrictions differ significantly from those of attending physicians; in one survey of surgical programs, residents were more likely to favor work hour restrictions. Senior residents, as opposed to those in the first two years of training, were more likely to view resident work hour limits negatively.<sup>38</sup> These differences may be due to unrealized expectations of fewer work hours for senior residents themselves as responsibilities are distributed more equitably across all years of residency. Faculty physicians were also more than twice as likely to believe that residency training should be lengthened in order to accommodate the negative effects of work hour restrictions on resident. Similarly, it should be noted that faculty would also be expected to increase responsibilities for direct patient care when resident work hours are reduced.<sup>39</sup>

No significant impact on the number of residency positions in New York (as a response to fewer hours worked) can be found in the period of time after the Bell regulations were implemented. In December of 1988, 12,218 residents were in training programs in New York State, representing 15.1% of all residents in the United States.<sup>40</sup> By 1997, when the Balanced Budget Act (BBA) of that year imposed caps on the funding of resident positions through the Medicare program, New York State was training 14,481 residents—still accounting for 15.1% of all residents in the U.S.<sup>41</sup>

Several proposals address ways to improve training without lengthening residency.<sup>42</sup>

1. Night Float The night float system reassigns individual residents or teams of house staff to night duties, generally for an entire rotation or significant portion

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<sup>36</sup> Dunn MR, 2003.

<sup>37</sup> Conigliaro J, Frishman WH, Lazar EJ, Croen L. Internal medicine housestaff and attending physician perceptions of the impact of the New York State Section 405 regulations on working conditions and supervision of residents in two training programs. *JGIM*. 1993 Sep;8(9):502-7.

<sup>38</sup> Whang EE, Mello MM, Ashley SW, Zinner MJ. Implementing resident work hour limitations: lessons from the New York State experience. *Ann Surg*. 2003 Apr;237(4):449-55.

<sup>39</sup> Weinstein 2002.

<sup>40</sup> Etzle SI, Egan RL, Shevrin MP, Rowley BD. Graduate Medical Education in the United States. *JAMA* 1989; 262(8):1029-37.

<sup>41</sup> American Medical Association. Graduate Medical Education (Table). *JAMA* 1998 280: 836-841.

<sup>42</sup> Darosa DA, Bell RH Jr, Dunnington GL. Residency program models, implications, and evaluation: results of a think tank consortium on resident work hours. *Surgery*. 2003 Jan;133(1):13-23.

thereof.<sup>43, 44</sup> Day shifts hand off responsibilities (such as cross-coverage of patients, admitting new patients) to the night float team. Many internal medicine programs have instituted night float systems in response to their RRC requirements and survey data indicates support of such programs by house staff. Night float models provide a means to redistributing workload across all residents levels and may eliminate the need to hire more residents or to lengthen residency training. However, utilizing additional resident services at night may lead to an effective decrease in resident numbers during the day.<sup>45</sup> One study of radiology residents found an increase in quality of care and fewer errors associated with use of a night float system.<sup>46</sup>

2. Mentor or Apprentice Model The apprenticeship model pairs residents with a faculty mentor whom they work exclusively with for a period of time. This differs from the normal attending structure where residents may work with a series of faculty, particularly in the surgical disciplines. Conceptually, the model allows for continuity of care across the spectrum of inpatient and outpatient care, similar to what physicians might encounter in eventual practice.<sup>47</sup> Individual resident needs can also be matched with suitable mentors, though potential for poor pairings exists. A study of one surgical residency's utilization of the mentoring system found that continuity of care was higher compared with the traditional team structure, but that resident work hours also *increased* by 25%. Residents were also exposed to fewer procedures under this system, potentially decreasing educational quality.<sup>48</sup>
3. Q4 Out the Door The q4 model is the most traditional model in that the every fourth night limitation to resident call is observed; residents leave in the morning

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<sup>43</sup> Rosenberg M, McNulty D. Beyond night float? The impact of call structure on internal medicine residents. *JGIM*. 1995 Feb;10(2):95-8.

<sup>44</sup> Yu JN. Night shift call systems in family practice residencies. *Fam Med*. 1994 Mar;26(3):163-7.

<sup>45</sup> Darosa 2003.

<sup>46</sup> Mann FA, Danz PL. The night stalker effect: quality improvements with a dedicated night-call rotation. *Invest Radiol*. 1993 Jan;28(1):92-6.

<sup>47</sup> Darosa 2003.

<sup>48</sup> Chung RS, Verghese J, Diaz J, Eisenstat M. One-on-One Mentor-Resident Rotation for Improving Continuity of Care in a Surgical Training Program, *Journal of Surgical Research*, Volume 69, Issue 2, May 1997, 359-361.

when the on-call period (24 hours) ends.<sup>49</sup> This model is consistent with new ACGME guidelines, though these allow for an additional six hours of inpatient care coordination and educational conferences without the added responsibilities of new patient admissions. While this model allows for reduced resident hours, it can negatively impact the educational experience of residents who remain in the hospital who will have increased patient care responsibilities shifted to them.

Other models for re-structuring resident work hours exist and are being developed, and include using archived didactic instructions for residents who miss actual conferences. Regardless of approach, decreasing overall work hours, particularly in the surgical disciplines, will require evaluation of the educational value of resident activities. Administrative endeavors (assuring authorization from insurance companies), repetitive documentation, “scut” work (patient transport, finding missing files), and ancillary clinical activities (phlebotomy) lose educational value quickly. However, these activities must be shifted to other individuals in the teaching hospital if resident work hours are to be restructured.

### Hospital Costs

There is general agreement that new limits will mean increased costs for the nation’s teaching hospitals. New York’s Bell regulations provided for an additional \$200 million in 1989 for the hiring of ancillary staff by its teaching hospitals in expectation of significant cost shifting to workers other than house staff. In fact, by 1997, New York hospitals had received \$1.2 billion to assist in compliance with the regulations—this despite their limited success in adhering to the new rules.<sup>50</sup>

Resident work hours can be decreased through a reduction in educational or patient care activities, and through increased efficiency. In a typical day, residents may spend time in formal educational activities such as morning report, didactic sessions with attending

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<sup>49</sup> Darosa 2003.

<sup>50</sup> Fein EB. Flouting law, hospitals overwork novice doctors. *New York Times*. December 14, 1997; Metropolitan Desk:1.

physicians, and lunchtime conferences. That is, on a weekday, up to three to four hours of resident time may be spent in purely educational endeavors; cutting these activities in half would potentially reduce the average resident workweek by 7-10 hours. However, this is unlikely to occur, both because of the need for resident physicians to be present in the hospital during average working hours of non-physician personnel (when diagnostic facilities are readily available, et cetera) and because a residency program devoid of formal educational activities is unlikely to remain viable due to physician trainee choices available at the time of residency selection and RRC requirements. It is more likely that a restructuring of clinical duties, particularly nighttime duties, would occur.

In 1990, Thorpe estimated the cost of Bell regulation implementation at \$358 million a year for New York hospitals. Thorpe based these assumptions on averages of over 90 hours per week for interns and the addition of attending physicians and senior residents for 24-hour supervision of junior residents<sup>51</sup>; this level of immediate supervision is not necessary in most cases, though residents should have access to attendings and chief residents for consultation at any time.

Replacing resident physicians with full-time attendings is inefficient, given the fact that many resident activities require minimal clinical experience.<sup>52</sup> Since Thorpe's analysis and the implementation of the Bell regulations, the role of non-physician providers (NPPs) has vastly expanded in the inpatient and outpatient settings, and reimbursement policy has facilitated their use alongside physicians.<sup>53</sup> A more likely substitution of resident activities would involve extended ancillary services (IV placement and phlebotomy services, patient transporters) and use of NPPs. Many university hospitals, such as Beth Israel and the Massachusetts General Hospital in Boston, and Yale University Hospital in New Haven, have already announced plans to increase hiring of

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<sup>51</sup> Thorpe, KE. House staff supervision and working hours: implications of regulatory change in New York State. *JAMA* 1990; 263(23):3177-81.

<sup>52</sup> Magnusson RA, Hedges JR, Harper RJ, Greaves P. First-postgraduate-year resident clinical time use on three specialty rotations. *Acad Emer Med* 1999; 6:939-946.

<sup>53</sup> Druss, Benjamin G., Marcus, Steven C., Olfson, Mark, Tanielian, Terri, Pincus, Harold Alan Trends in Care by Nonphysician Clinicians in the United States. *NEJM* 2003 348: 130-137

nurses and physician assistants (PAs).<sup>54</sup> Physician assistants, in particular, have widely been used in surgical services to cover inpatient services when attending surgeons are not immediately available.

PAs represent a more attractive substitution for many resident clinical activities than attending physicians. However, the average salary of a physician assistant is close to \$70,000 a year (higher for general surgery, surgical subspecialties, obstetrics and other specialties where resident hours are highest) whereas that of a third year resident is just over \$40,000 a year.<sup>55, 56</sup> Using the average resident work week of 56 hours and the average PA workweek of 44 hours, their average hourly earnings are about \$14 and \$28 per hour, respectively: twice as high for physician assistants.<sup>57</sup>

It is difficult to determine what level of substitution is necessary resident physicians; Thorpe's cost estimates would translate to over a billion dollars in substitution costs for the nation's teaching hospitals; others have estimated \$800,000 million a year.<sup>58</sup>

Assuming resident hours would decrease 10% for those working greater than 70 hours per week (e.g., Neurosurgery, Obstetrics and gynecology, Pediatric Surgery, Thoracic Surgery, General Surgery), about 93,000 resident hours per week would have to be made up, representing the average work week of about 2,100 PAs; this would be at a cost, on average, of \$150 million a year for all of the nations teaching hospitals. If one includes modifications to the work schedules of those residents who exceed the 30-hour limit to on-call work periods (Pediatrics, Internal Medicine, Med/Peds, Med/Psych) the number of residents affected by a decrease in working hours would rise to over 43,500.<sup>59</sup>

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<sup>54</sup> Pope J. "Hospitals face limit on residents' hours." Associated Press.

<http://www.body1.com/news/index.cfm/2/7327/1> accessed 6/30/03.

<sup>55</sup> AAMC Data through UC Davis Office of Medical Education—Financial Aid.

[http://medome.ucdavis.edu/ome/faid/debt\\_link2.cfm](http://medome.ucdavis.edu/ome/faid/debt_link2.cfm) accessed 7/27/03.

<sup>56</sup> American Association of Physician Assistant data through Physician Assistant Newsletter. PA salaries.

[http://www.pa-newsletter.com/main/1998pa\\_salaries.html](http://www.pa-newsletter.com/main/1998pa_salaries.html) accessed 7/27/03.

<sup>57</sup> American College of Surgeons Annual Meeting. Physician extenders: the view of the oversight bodies. San Francisco, 2002. [www.facs.org/education/congress2002/gs24friedmann.pdf](http://www.facs.org/education/congress2002/gs24friedmann.pdf) accessed 7/27/03.

<sup>58</sup> ACS 2002.

<sup>59</sup> Resident numbers from American Medical Association. Graduate medical education. *JAMA* 2002; 288(9):1151-64.

Replacing seven hours of each resident's weekly activity with PAs would elevate the national cost to teaching hospitals to almost \$500 million a year. This scenario, replacing approximately 7 hours of the average workweek of residents working the greatest number of hours with activities of non-physician clinicians, is a reasonable expectation of substitution practices.

Nurse practitioners might also substitute, though their services have more often been used in the outpatient setting and they can be more expensive; at MGH, Nurse Practitioners are paid up to \$98,000 per year.<sup>60</sup> Other proposals would increase the number of residencies for physician assistants ("postgraduate PA programs") in teaching hospitals as a response to limits on resident work hours<sup>61</sup>; such programs run the risk of indenturing of one profession instead of another.

### **Future Issues for Resident Work Hour Limits**

#### **Measuring Impact**

ACGME plans for ongoing studies of compliance and is developing studies to assess the impact on patient care and on learning. While quality of care measurement continues to be developmental in many respects, patient outcomes can be measured, as can patient errors. Future studies examining the impact of decreasing resident work hours on quality of patient care will need to account for numerous other changes in health care, but are likely to aid in providing crude measurements.

There are few widely accepted measures of the quality of resident education, but board certification examination scores can be tracked over time through the period of transition to decreasing work hours. This approach has been suggested as one way to determine potential educational impact, and it is likely that surveys of resident and faculty perceptions regarding the quality of education will be ongoing.<sup>62</sup> However, there is no agreed upon definition of what activities in residency training are educational,

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<sup>60</sup> Weinstein 2002.

<sup>61</sup> Clinician News. "As residents sleep." <http://www.medscape.com/viewarticle/453224> accessed 6/3/03.

<sup>62</sup> Chao L and Wallack MK. Limits on resident work hours. *Ann of Surgery* 2003; 237:256-7.

particularly those activities which support but do not involve direct patient care such as chart review and documentation.<sup>63</sup> No census exists as to what activities have intrinsic educational value; this argument has helped fuel the debate over the limits of resident work hours and when residents function as trainees as opposed to employees.<sup>64,65,66</sup>

### Barriers to Change

Monitoring adherence to new guidelines will be difficult. Methods include electronic time keeping systems (using “card swiping”) which are used by many other workers in hospitals. However, the perception that these time keeping systems are intrusive or are only suited to lower level professionals may interfere with their success. Other mechanisms utilize written time cards completed during varying time periods, though these may impose further burdens on busy residents. Currently, information on monitoring practices is also being collected by the University Health Consortium.<sup>67</sup>

Another significant barrier to achieving the goals of work hour limitations is the moonlighting activity of senior residents who are fully licensed to practice medicine. It has been estimated that as many as half of senior residents moonlight, and this income generally doubles the stipend paid to residents by teaching hospitals.<sup>68</sup> Because this may represent an additional ten to twenty hours a week in clinical activity, any gains from limiting work hours within the primary teaching hospital may be offset by the increased moonlighting (though any moonlighting in institutions run by the teaching program count toward the ACGME limits).

The financial barriers to hiring substitute staff, or additional attending physicians, will be difficult to overcome for hospitals which are already facing declining profit margins. If

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<sup>63</sup> Moore SS et al. “How residents spend their nights on call.” *Acad Med* 2000;75:1021-1024.

<sup>64</sup> Lurie N et al. “How do house officers spend their nights? A time study of internal medicine house staff on call.” *NEJM* 1989;320:1673-7.

<sup>65</sup> Weinstein 2002.

<sup>66</sup> Volpp KGM and Grande D. “Residents’ suggestions for reducing errors in teaching hospitals.” *NEJM* 2003;348:851-5.

<sup>67</sup> Carrier, D. Presentation to COGME, April 2003.

<sup>68</sup> Li J, Tabor R, Martinez M. Survey of moonlighting practices and work requirements of emergency medicine residents. *Am J Emerg Med* 2000; 18(2): 147-51.

hospitals seek to expand residency positions, they face limits to Medicare subsidies for additional positions (which make the hiring of residents more attractive). Loopholes that allow for extensions of hours and difficulty in enforcing the new rules also pose significant barriers for successful implementation.<sup>69</sup>

Perhaps most difficult to overcome will be the culture of medical training which, particularly in the surgical disciplines, appears to believe that good training is consistent with thorough punishment through long work hours. The rationale of many is analogous to a “hazing” mentality, viewing an 80-hour workweek as “a response to the endless complaints that come from residents who feel that they are all overworked.”<sup>70</sup> Yet major changes in the U.S. health care system have increased the workload of resident physicians and increased the intensity of care in the inpatient setting<sup>71</sup> well beyond that experienced by the “giants” of medicine and surgery three to four decades ago. The training of resident physicians is being pushed to evolve along with the system of care, hopefully towards the improved health and well being of physicians and patients alike.

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<sup>69</sup> Volpp KGM, Grande D. Residents’ suggestions for reducing errors in teaching hospitals. *NEJM* 2003; 348(9):851-855.

<sup>70</sup> Strub 2002.

<sup>71</sup> Ludmerer KM. *Time to heal*. New York, NY: Oxford University Press; 1999.