Resident Work Hours

What They Are Really Doing

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Hypothesis: We attempted to better quantitate resident work within our system of care.

Design: Survey.

Setting: Academic training program.

Participants: Surgical residents.

Interventions: A work-hour survey was developed defining 5 areas of activity: patient care related to educational objectives, required educational activities, patient care activities unrelated to educational objectives, off-duty educational activity, and off-duty hours.

Main Outcome Measures: Total work hours and non-educational work hours were analyzed by resident level, rotation, and category.

Results: The survey response rate was 52%, covering 110 workweeks. Residents worked 80 hours or less for 57 weeks and more than 80 hours for 53 weeks. The mean number of hours worked was 77. Fewer than one quarter (21.9%) of work hours were unrelated to educational activities. The amount of time spent in noneducational activities was lowest at community hospitals (17%) and similar at the Veterans Affairs (23%) and academic (22%) medical centers. It did not vary by total hours worked, averaging 21% for rotations of more than 80 h/wk and 23% for rotations of 80 h/wk or less.

Conclusions: Residents spend a large amount of time in noneducational activities. Eliminating these activities would bring our rotations into compliance with the 80-hour workweek. It would also generate a large amount of time for educational activities within our training program.

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THE 80-HOUR WORKWEEK HAS forced surgical residency programs, first in New York and now across the country, to reexamine call schedules, monitor duty hours, and grapple with the financial burden of a reduced resident workforce. At the same time, programs are instituting efforts to ensure resident competence in accord with the Accreditation Council for Graduate Medical Education Outcome Project.1-4 To best answer some of the most difficult questions posed by the 80-hour work restriction, it is important to understand more than how many hours the residents work per week and whether they are getting the required off-duty periods. Data about what the residents are doing on duty, rather than simply how many hours they spend on duty, are required.

Work-hour limits have dominated the discussion about our training programs, but within this debate is an issue of service vs education. The conflict between service and education continues to be a source of tension in our current model of medical training, and separating these 2 is often difficult.3 Our objectives in performing this analysis were not only to allow the trainees to record their work hours but also to assess their educational time vs noneducational (service) time. A secondary aim was to identify how much noneducational time was being provided by our residents and what type of support would be needed if this time were eliminated.

METHODS

The surgical residency program at the Medical College of Wisconsin graduates 6 categorical residents per year who rotate at 3 core Milwaukee hospitals (Froedert Memorial Lutheran Hospital, Clement J. Zablocki VA Medical Center, and Children’s Hospital of Wisconsin) and 2 affiliated community hospitals. At any given time, 42 general surgery residents are assigned to clinical rotations at 1 of these 5 hospitals. To determine what residents were doing during their time in the hospitals, a work-hour survey was developed with input from the residents, program coordinator, and program director. Five categories were defined: patient care related to educational objectives, required educational activities, patient care unrelated to educational objectives (scut work or...
noneducational patient care), off-duty educational activity, and off-duty hours. Educational patient care included clinic time, teaching rounds, procedures, and time in the operating room. Required educational activities consisted of weekly conferences such as grand rounds, morbidity and mortality, case review conference, and teaching rounds. Rotations have between 4½ and 7½ hours of required weekly educational conferences. Noneducational patient care included blood draws, time spent obtaining radiology reports, transport, and operating room delays. Self-study included studying and conference preparation time. Off-duty hours included sleep, recreational time, and vacation. At the beginning of the evaluation period, the program director met with all the residents and explained the reason for the survey, the mechanics of the survey, and the definitions used for the 5 categories. Examples of the 5 categories were discussed and clarified. The survey instrument used required the residents to determine how many hours each day were spent in each category and to note whether they were on call. The survey was given to all clinical residents 3 times during the year; all surveys were before the July 1, 2003, date for mandatory compliance with the 80-hour workweek. The survey period was 5 weeks. Residents were responsible for picking up and turning in time sheets to the program coordinator during each period; reminders were sent from the program director’s office to residents who did not turn them in.

Descriptive statistics were used to summarize data. The overall mean percentage of noneducational time by resident postgraduate level and rotation site was compared using analysis of variance and SAS PROC GLM (SAS Institute, Cary, NC). Duncan multiple comparisons method was used for pairwise comparisons. The mean percentage of noneducational time between weeks with more than 80 hours worked and weeks with 80 hours or less worked was compared using t test. For all analyses, the significance level used was $P < .05$. The SAS statistical package used was version 8.

## RESULTS

Residents returned data on 110 workweeks, for a response rate of 52% (210 total possible workweeks). The response rate varied from 41% for postgraduate year 2 (PGY-2) residents to 72% for PGY-5 residents, with significantly higher response rates for PGY-5 residents compared with PGY-4, PGY-3, and PGY-2 residents. No other significant pairwise differences were seen. Data from all surveys were included, even if the weekly total was less than 168 hours. For this reason, 250 hours were not accounted for. These hours were not included in any category. The fewest number of hours worked was 22 by a PGY-4 resident, with a maximum of 123 hours by a PGY-1 resident. The distribution of the types of activities done during work hours was similar by PGY level and rotation site, as well as by time of year the survey was administered (Table 1 and Table 2). The variation in required educational time is primarily due to the 3-hour attendance requirement by resident postgraduate level. The percentage of total work hours devoted to noneducational patient care varied from 10% to 31%. This was lowest for PGY-4 residents, with PGY-1 residents working significantly more noneducational hours than PGY-3 and PGY-4 residents (Table 1). The percentage of time spent in noneducational patient care also did not differ significantly by rotation site (Table 2).

As a whole, the program was compliant with the 80-hour workweek, averaging 76.6 h/wk (Table 1). However, the workweek ranged from 22 to 123 hours, and during 53 weeks, residents worked more than 80 hours. The percentage of time spent in noneducational patient care did not vary by compliance with the 80-hour workweek, averaging 21% for rotations of more than 80 h/wk (53 weeks) and 23% for rotations of 80 h/wk or less (37 weeks) ($P = .48$).

## COMMENT

Our residents spend approximately 23% of their on-duty time in noneducational activities. This is almost 17 h/wk, 68 h/mo, and 816 h/yr. If this amount of time could be identified and isolated from the residents’ current schedule,
what could be done with it? The opportunity this provides is enormous, from 2 different but equally important perspectives. First, eliminating these service hours would allow compliance with the 80-hour workweek without major restructuring of the educational program. Although some might argue that some service activities provide educational opportunities, the education is usually subordinate to service. The reality of having trainees’ hours limited forces us to consider other options to achieve whatever educational value these service activities may provide.7,8

The second, and more important, opportunity comes in thinking of these hours as potential educational hours. Educational experiences need to be planned and scheduled; we have a responsibility to teach our trainees rather than just letting them experience patient care and hoping they end up as competent surgeons at the end of their training. This approach will require more curriculum and faculty development for all of us and will need to be focused on the Accreditation Council for Graduate Medical Education competencies.9 The model may need to incorporate aspects of graduate school curricula, rather than the experiential or immersion model that has functioned as the foundation of surgical residency for so long.3,5,7,8 Carefully planned conferences, study hall, skills laboratory training, and guided self-study are ideas that need to be explored and adopted more widely.7,8,10-12 Even the operating room, an obvious educational venue, is underused.13

Threatening this discussion is the question about who should pay for the paradigm shift. There is no question that it is expensive. In 1990 dollars, the estimate in New York was that $33 million would be required to hire physician assistants to replace surgical residents and become compliant with the 80-hour workweek. This did not include the more than $64 million estimated for ancillary services.1 To help with these costs, approximately $226 million of state funding was made available to hospitals in New York.14 Such additional funding does not appear to be forthcoming for the rest of the country. Graduate medical education is now funded by Medicare, Medicaid, hospitals, medical schools, voluntary health organizations, and faculty practice plans.15 Each makes the case that the others should fund the current workforce shortage occurring as a result of decreased resident work hours, and programs must try creative solutions to get by.

Framing the question as service vs education may help find solutions. If the service aspect is paramount, then funding from the service part of our health care system is logical. If education is our goal, different strategies may be necessary. This might need to occur as reallocation of graduate medical education Medicare dollars, more medical school support financing of clinical faculty educational efforts, or even tuition for medical education from resident trainees.

Our data have weaknesses: a 52% response rate and the bias of self-reporting. We asked our trainees to help define the categories and asked them to be the arbitrators when categorizing their hours. The similarity between sites and years suggests that the trainees were consistent in their use of the survey tool. This similarity suggests that more responses would not have changed the overall results, and that the residents rate the same activities as having similar educational value. Folse and DaRosa16 found that residents perceived programs as more heavily weighted toward service, while program directors believed the same programs emphasized education over service. We tried to overcome this potential bias by having residents code activities rather than general impressions, and by reviewing the survey with the residents before implementation. Our residents report more time in noneducational activities than a 1990 study7 done with similar methods; 9% of the residents’ working hours in a program with 2 federal and 5 private hospitals were spent doing ancillary tasks. At that time, the overall workweek averaged 90 hours. In this 1990 study, on-call sleep was categorized separately, accounting for approximately 10% of the total working hours. With the increased patient load and fewer residents in the hospital at any one time, our residents do not sleep much on call. In addition, there was no distinct category on our survey for on-call sleep. In many cases, the residents viewed this as time away from family, not of any educational value, and not directly related to patient care, so it was often coded as noneducational time.

We have continued to monitor our trainees’ work hours, but have simplified the tool at the residents’ request and now do not track categories of work hours. Compliance with the 80-hour workweek has improved, with an overall mean of approximately 70 hours and with 30% of reported weeks comprising more than 80 work hours (compared with almost 50% before July 1, 2003).

Our data have been used to alter our patient care environment. Residents have been reallocated, particularly the PGY-2 residents. We have increased the number of physician extenders from 6 to 13½ full-time employees. Whether they have reduced the residents’ noneducational time is unknown, although a reduction in hours and change in tasks for residents after the addition of health care technicians and physician assistants have been recently reported.17,18 Hospital support has come in the form of a blood-drawing team and an intravenous line team. However, the culture of calling residents for minor details of patient care and clarification of orders continues.

We believe our trainees’ assessment of their noneducational hours is accurate. Some activities that the residents consider noneducational include tracking down radiographs, waiting to round with individual staff, and coordination of care and paperwork associated with discharging patients. They also continue to do more traditional service activities at the Veterans Affairs medical center, including drawing blood, performing electrocardiograms, and transporting patients. Hospitals and our medical practices must invest in information technology,19 more hospital support personnel,17,18,20 and initiatives that reduce patient, nurse, physician, and resident frustrations.21 As this is done, our programs must look at ways to use the time we free up from our trainees’ daily schedules to enhance their educational experience.

Assuming that half of the noneducational time, or 8½ hours per week, is available to all of our programs, how should we proceed? Focusing on excessive hours deals only with the symptoms, not the root cause of the problem.21 It is unfortunate that much of the work-hour discussion focuses on resident health and satisfaction, patient outcomes, and costs.23 What is missing is the Ac-
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REFERENCES

4. ASC Faculty Development Committee. Meeting the challenges of the 80-hour work week: how will we adapt? Focus. 2003;20:20-22.

DISCUSSION

Leigh Anne Neumayer, MD, Salt Lake City, Utah: I would like to congratulate the authors on being ahead of the curve as far as I can tell with the 80-hour workweek and also in attempting to quantify what their residents are doing, which is something that we all need to know.

First of all, a 52% response rate for a survey is very good, but it would be nice to be assured that the nonrespondents are similar to those who responded, at least by their rotation site or PGY year. You imply in the manuscript that the similarity and categorizations of their time spent among PGYs and sites suggest more responses wouldn’t change the results, but we need more verification that the nonresponders were the same as the responders.

In the abstract and the body of the manuscript, you also mention the data were collected during 3 time periods, and I am taking that to mean that it may have been collected a week in July, a week in December, and a week in April, and, if that is the case, did you see any learning curve? That is, were the interns doing more scut work at the beginning of the academic year than they were further on, because that would lend some more validity to your model?

Thirdly, do you really have enough data to tell what it is you need to eliminate? You did not share any of that data either during the presentation or in the manuscript as far as what exactly constituted those noneducational hours. I have worked in many hospitals, and we have had IV teams and blood-drawing teams even at the VA for a long, long time, so it would be nice to know the specifics of activities. I would direct you to a paper Dr Myriam Curet presented looking at reducing unnecessary floor calls to the residents.

Lastly, in the manuscript you mention that maybe we need to change out of the apprenticeship model, and I would say that we have not been in an apprenticeship model. We have been using an immersion model, both for residents and medical students, thinking that if we just put them under water long enough, they will learn how to swim. We have to change our model.

Dr Brasel: We did not find any difference by the rotation site or by resident level, and there really was no difference by the time the survey was administered. It was actually 2 weeks, 2 weeks, and then 1 week, and the interns either did not learn how to be more efficient or our system does not allow them to be more efficient late in the year compared to early in the year, at least, again, as they categorized their hours. As I said, we did not follow them around and ask them exactly how they were categorizing time. One of the things that generates the most complaints in terms of wasted time or noneducational time is waiting for radiology reports and waiting for x-rays, despite the fact that we do have an electronic radiology system. You talked about what Dr Myriam Curet has done. We have tried to implement something similar, working with the nurses on the floor,
Trying to batch their calls, etc. We have not been able to implement that with any success to try to decrease the noneducational time of the residents. As we have tried that model, I am not sure where exactly it has broken down. It is probably a combination both in nursing leadership and nursing culture, as well as the physician culture and the resident culture in Milwaukee. I would agree that we have had more of an immersion or an experiential model, and I think that paradigm has to change.

Jerry M. Shuck, MD, Cleveland, Ohio: Dr Brasel, I really appreciate you putting this on the program. There is a burgeoning cottage industry now of seminars on duty hours and seminars on competencies. These programs are very well attended because program directors are worried. They are not only worried because of the restrictions of these new rules, but they are worried because of reports of summary withdrawal without probation and the probation of some programs at prestigious institutions. We need to make changes fast, but can we afford the changes? Most of us can’t hire 50 to 80 PAs as done at some institutions. No hospital can afford these things now.

What are the residents really doing in those 17 hours of “wasted time”? It is not really drawing blood and carting patients around; that is over. Are they waiting for reports and trying to get a patient discharged? Sometimes, up to 6 forms, including discharge summaries that are 3 pages long, consume many hours. Why hire an expensive PA when you can hire an entry-level secretary for those things? A better understanding of how residents are using those 17 hours would help us all. Maybe you can elaborate about complaints related to discharges and paperwork, rather than other activities that are actually quite mythical.

Dr Brasel: The ancillary staff that people are talking about now really are not the IV teams and the blood-drawing teams, but they are people who are able to manage and track information. Even our nurse practitioners and our nurse clinicians who help with a lot of that paper tracking have complained that they are overqualified for much of the information transfer that is being shifted now more towards the nurse practitioners and nurse clinicians. There have been a few studies that have looked at the health assistant/health technologist as somebody to work with that information transfer. Those people are some of the ancillary support staff that are going to have to take some of the tasks that have traditionally fallen on the residents in terms of the discharge planning and information overload.

Thomas R. Russell, Chicago, Ill: One thing that I hear frequently from program directors is the idea of continuity of care, and you are obviously shifting some of your care to non-physicians, physician’s assistants, nurse practitioners, and sub-interns. Have you utilized protocols to a greater extent in your hospital, and have protocols and best practices helped in this dilemma that you have, as far as the work hours?

Dr Brasel: We do have protocols on many of the services. There are protocols or pathways for most of the uncomplicated bowel operations, biliary surgery, pancreatic surgery; there are protocols on the trauma service, as well as in the ICU. The best providers of the continuity of care, outside perhaps of the faculty, within our system are our nurse practitioners, rather than the residents.

William P. Schecter, MD, San Francisco, Calif: This is the most important challenge facing surgery today. What effect do you think the change is going to have on the surgeon practicing 20 years from now? Is that person going to have the same professional ethic? Will he or she be there when their patients have complications? Is the new generation, which is being trained in shift work, going to have the same values that everybody in this room has?

Dr Brasel: I would hope that they would have the same professional ethic. I would venture to say, or it is my belief, that they will practice more in a multidisciplinary group and that they will not be the one taking care of their complications. It will be more of a group practice, much like OB has done, where the obstetrician is not always on call and may not be the one to deliver the patient they saw all the way through their pregnancy. That is a model that I think will probably come to pass.

Lawrence A. Danto, MD, Truckee, Calif: It is being increasingly shown that physician burnout begins in residency, and this may have less to do with hours worked and more with loss of freedom in the learning/work environment. It is a brave new world. How do you put the fun back in the equation?

Dr Brasel: I wish I had the answer to that one. I think minimizing much of the paperwork, administration, and the information overload and really getting back to both more of the focus on actual education rather than the administration of much of the training program and focusing on taking care of patients will help, but I certainly don’t have the answer to that question.

Thomas A. Stellato, MD, Cleveland: Can you tell us when the residents actually filled out the survey? Was it at the end of their workday, at the end of the week, end of the month? That time might indicate some of the accuracy of the survey. And secondly, can you tell us about that resident who had the 22-hour average workweek?

Dr Brasel: The 22-hour average workweek was on endoscopy, where they are supervised to a much lesser degree. They do a few scopes, and they have the opportunity to stay and do more or go home. Some of the chief residents did choose to go home. I do not know whether our residents completed the surveys at the end of the day or at the end of the week, but they were required to turn them in at the end of the week. So at the very most, the time bias or recall bias would be 1 week. Some fill out their hours on a daily basis, and some do it at the end of the week.

Vijay K. Mittal, MD, Southfield, Mich: I just wondered about changes in the curriculum. What are you considering changing in the time spent for teaching? Are you going to consolidate the lectures for the week in one day, and how are you complying with the chief residents’ working hours, because that is very difficult for us.

Dr Brasel: Our chiefs are as in compliance or as out of compliance as the rest of the service or the rest of the residency. On trauma, the chiefs, as well as the rest of the residents, go home post call so whether they are an IV or V chief on the trauma service, they go home post call. The rest of the chiefs have home call, and because all of the acute general surgery is taken care of by the trauma service, home call for the most part for the chiefs on the other services does not end up counting, because they are not disturbed maybe but once a night.

The curriculum is certainly something we are struggling with both locally and nationally, and the question is if we have a more defined and uniform curriculum, not only locally but across the country, will that help with some of the work hours and some of the struggles with trying to come up with different things for every specific program.

Norman C. Estes, MD, Peoria, Ill: I am concerned about the design of this study. There are many hours spent which the residents call scut which are necessary parts of patient care, a required competency to understand health systems. The best value of this resident assessment is to see how the residents perceive how they spend their time. Then have an in-depth discussion to try to correct the program. The hospital is our classroom, and there is a lot of variation in each hospital. Each program has to correct as they can.

Dr Brasel: As I said, the residents reported, and it is a self-report, so there is some bias. Other than a time and motion study that would be very difficult and also very expensive to complete, this at least allowed us to get an initial handle on this situation; they do spend an inordinate amount of time doing things that in an immersion may have been educational once, but I think we have to get away from that philosophy.