

Defining Clinical Effort for Hospital-Based Pediatricians

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Every academic medical center aims for excellence in patient care, teaching, and research; this includes quality and safe patient care, patient and family satisfaction, provider engagement and wellness, and cost-efficient utilization of resources. Optimal staffing schedules are important for achieving these aspirations. Creating a hospital-based physician staffing model has been problematic, because no universally agreed-upon method to measure physician work effort or productivity exists. Allocating inpatient physician staff equitably may be particularly challenging when there is unpredictable variation in the clinical service from shift to shift. Metrics of physician work effort that have been used include measurement based on work relative value units (wRVUs), value measurements (ie, safety metrics, patient outcomes, and satisfaction), time-based work hours (eg, hours on service per day, week), or budget-based (eg, number of physicians based on income with possible profit sharing).¹ Metrics that have been developed to compare physician effort in ambulatory settings do not translate well to hospital-based services.

Here we review various models used in neonatology to define work expectations for a full-time equivalent (FTE) faculty member. These models are based on similar principles but vary in ways that may be unique to the specific settings. We present examples of how these approaches are used to address equity in physician staffing.

Background

Physician work hours have declined steadily over the past 30 years.² Factors contributing to this decline include changes in residency work hours, altered work expectations, changes in work/life balance, and an ever-increasing concern of burnout. During this same time period, there have been changes in expectations for faculty oversight and availability for inpatient care. Historically, in-house coverage for pediatric patients was provided by trainees (ie, residents and/or fellows). The academic faculty member was responsible for daytime rounds, education, and supervision and may have been available by phone for questions on nights and weekends. Because trainees received extensive experience in the clinical service, care management decisions and procedural

skills were generally adequate without the need for faculty members to participate in hands-on care during “off hours.” This division of labor left the academic hospitalist with ample time during the day for other academic, nonclinical pursuits. Today, however, pediatric hospitalists have joined neonatologists and pediatric intensive care physicians as being commonly responsible for staffing inpatient units for 24 hours a day, 7 days a week. Current work expectations for an academic intensivist/hospitalist include directing hands-on care, providing in-house coverage during nights and weekends, and expending significant effort on electronic medical record documentation. With reductions in neonatal intensive care (NICU) rotations for pediatric residents, much of the collaborative work in the intensive care setting is now performed by advanced practice providers.³

Quantifying workload and productivity for a hospital-based pediatrician is challenging. Generally, physician clinical workload in ambulatory care is measured by the number of clinics staffed, number of patient encounters per unit of time, or wRVUs generated.⁴ Several studies have used wRVU benchmarks to construct performance-based compensation models and have succeeded in increasing productivity.⁵⁻⁷ However, although this approach may be reasonable in the ambulatory setting, it is not an equitable measure for hospital-based specialists. Most of the inpatient professional revenue is based on bundled 24-hour billing codes. Although reflecting effort for the entire 24-hour period, wRVUs typically are credited to the daytime provider who performs rounds and documents; the physician working at night may generate no or few wRVUs (Table I, available at www.jpeds.com). In reality, the hours spent by a neonatologist in daytime management represent a minority of clinical hours necessary to care for NICU patients,⁸ and thus wRVUs assigned in this way do not directly reflect clinical effort. In addition, neonatologists do not control admission patterns or influence the NICU census, patient acuity, or other factors that modify work effort (as measured by wRVUs). Consequently, the lack of correlation between wRVUs and clinical FTEs for neonatologists is not surprising.⁹

FTE	Full-time equivalent
NICU	Neonatal intensive care unit
wRVU	Work relative value unit

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Considerations for Possible Hospital-Based FTE Models

A simplistic approach is a model that calculates the available hours per clinical FTE using assumptions for allocation of time and effort (Table II, available at www.jpeds.com). An academic division director can then calculate the total clinical hours needed to staff all patient care sites, including night and weekend calls, and the total number of hours can be divided by the clinical hours available to determine the number of clinical FTEs needed to cover clinical service. This simple model of calculating hours has several potential flaws, however. First, using neonatology as an example, many neonatologists work more than 40 hours per week. Second, various NICUs may be staffed differently based on acuity level. The time commitment and intensity of work in providing care at a level IV NICU may differ greatly from that at a level II or III NICU.¹⁰ Quantifying these factors when defining workload expectation for a clinical FTE is a major challenge.

In a pay-for-production model, the clinical department is paid a specific amount by the health system, usually calculated as dollars per wRVU, or using other clinical activity-based metrics. The higher volume of work translates into more billings, which result in increased dollars paid to the department. This model provides for clinical incentives but offers no financial support for nonclinical activities. Divisions that generate high wRVUs (eg, neonatology—median, 10 626 wRVUs per faculty per year) generate more clinical revenue per faculty member compared with other divisions in the Department of Pediatrics (eg, genetics—2244 wRVUs per faculty per year).¹¹ However, subspecialty services, such as genetics, and follow-up by developmental-behavioral pediatrics are vital for optimal function of a robust NICU service.

A value model aligns payments with defined, transparent professional expectations (eg, clinical care, quality, outreach, teaching, research) that are of value for the department within the organization. This model could benefit service lines that bring a diverse range of benefits to the organization but also could disadvantage other service lines that are less profitable and may be engaged in activities for which quality metrics are less well defined. A deficit-covering model uses projections of past performance to develop a departmental budget. If the budget results in a negative at the end of the year, the health system absorbs the cost. This model has less risk for the department, emphasizes annual financial improvements, but could remove the departmental autonomy over financial matters. In a contribution model, a health system pays for profitable services, which offers a clear view of the system goals, pointing to a direct relationship between profit and support. This model also offers varying support for different subspecialties but may marginalize teaching and research.¹

Other reports have reviewed incentive-based physician compensation programs, including not only wRVUs, but also measures of academic productivity.^{4,12} Compensation

models in which varying percentages of practitioners' salaries are at risk based on productivity may result in increased supplemental pay in exchange for increased clinical work.^{13,14} One could argue that practices in which practitioners have little control over the number of patients or the billings, such as neonatology and pediatric critical care, will not be incentivized appropriately with wRVU measures, and that models involving direct assessment of clinical hours are more realistic. Although some medical groups have developed models to quantify workload time to objectively forecast staffing needs,^{15,16} those models might not align with financial realities.

Case Studies

To highlight the complexity of defining an FTE, we present 3 case studies that demonstrate different ways in which complex academic neonatology divisions define workload.

Case Study 1

A large NICU in the southern US has an average daily census of 150 patients and >50 faculty members and uses a demand-capacity matching model based on units of time (hours), similar to that used for nursing workload and FTE calculations. Multiple attending neonatologists are on service each day with a fixed maximum number of patients per attending physician (based on acuity of patients and presence/absence of midlevel practitioners or trainees). This staffing pattern generates multiple shifts to be covered daily. The demand (total number of hours of clinical coverage required per year) is calculated as number of shifts per day × number of hours per shift × number of days per year. This calculation is performed separately for the following types of shifts: weekday, weeknight, weekend day, weekend night, holiday daytime, and holiday nighttime. One hour of clinical work in a low-acuity setting (eg, step-down unit) is given equal weight as an hour in a high-acuity setting (eg, level IV NICU). Next, the total hours per year available to provide clinical coverage from the pool of attending physicians is calculated as follows: total number of clinical FTEs × 1456. A separate database is maintained that tracks the clinical FTE of each individual physician, accounting for partial clinical FTEs from part-time work and reduced clinical time from grant funding and funding for administrative roles, to derive the total clinical FTEs available. The 1456 is the available clinical hours from 1 full clinical FTE per year after subtracting vacation, holidays, and unfunded time allocated to academic activities. Comparing the demand for clinical hours per year against the capacity of clinical hours per year allows for an explicit calculation of FTE gaps or surpluses.

Case Study 2

A midsized (~30 faculty members) Division of Neonatology in the midwestern US uses a points-system model, which requires that full-time faculty achieve a certain number of points annually.⁸ A neonatologist who has protected time

for externally funded research will have the annual point requirement decreased in proportion to the time required by the specific funding source. The division leadership determined that all clinical assignments receive points, including weeks on service, night shifts, and weekend on-call obligations in a variety of facilities, including level IV NICUs, community level III and level II NICUs, the home ventilator program, and other ambulatory services. The goal was to develop a homogeneous system for managing heterogeneous clinical activity with an equitable system of management.

Each 2-week service block, plus weekends, holidays, and night call, are assigned points based on the average patient number, acuity/intensity, hours, and burden to accomplish the work (eg, documentation needs, in-house vs home call). Different clinical venues are awarded different points, with the highest point value for the level IV NICU. Points can be achieved with a flexible schedule, which would mean fewer total weeks on clinical service if a provider opts to only work clinically in the level IV NICU.

Case Study 3

A Department of Pediatrics in the western US follows the Clinical, Administrative, Research, Teaching, Service or “one-minus” model. Basic principles ensure a combination of clinical, administrative, research, teaching, and service (or strategy) to university/community should total 1.0 FTE. Equity is maintained in all divisions in the department. For example, in the NICU or pediatric intensive care unit, a 12-hour dayshift and sign out is given a 0.04 FTE credit per week (or 25 weeks of dayshift service = 1.0 FTE). A 12-hour nightshift and sign out is given a 0.045 FTE credit per week (~22 weeks of nightshift service = 1.0 FTE). Outpatient clinics are assigned 0.0025 FTE/4-hour clinic (or 409 clinics/year = 1 FTE). An individual physician’s service assignments are determined by other administrative, research, teaching, and service responsibilities (Table III, available at www.jpeds.com). The advantage of this model is that it allows for comparisons between different divisions and maintains transparency regarding clinical service requirements. Table IV (available at www.jpeds.com) provides an example of this methodology applied to a developing physician scientist. Increased clinical productivity (wRVU above median, adjusted for clinical FTE, academic, teaching, or service excellence) are rewarded with bonus payments.

Department Perspective

An academic department has many missions, among which are ensuring excellent clinical care outcomes, managing academic products (including extramural funding), educating trainees, balancing compensation and resources in the face of increasing financial pressures, promoting advocacy, and providing faculty career development. The department also needs to ensure that each faculty member can achieve a high degree of professional satisfaction, have an array of

opportunities for career development, receive fair and competitive compensation, receive equitable treatment, feel a sense of being valued, and achieve a work–life balance to prevent burnout. The department and the faculty member need a system to distribute time and effort in various endeavors (eg, clinical, administration, research, teaching, service/strategy development) so each is aware of their responsibilities and is held accountable.

From a departmental perspective, maintaining an impartial, transparent, and simple approach to provider FTEs across all divisions is vital. Models based on hours of work and using benchmarks from Association of Administrators in Academic Pediatrics or Association of American Medical Colleges to pay a median salary and achieve median wRVU generation are considered reasonable and could result in bonus payments, but similar incentives need to be in place to reward excellence in other areas serving the mission of the department.

Discussion

The case studies underscore that the work of a neonatologist is similar regardless of the institution. Differences relate to how that work effort is calculated and how total effort is allocated between “clinical” duties vs other missions (“Administrative, Research, Teaching, Service”). Because administrative metrics used to measure clinical productivity are generally established for ambulatory care, they might not align with models for work expectations of a hospital-based pediatrician, which can result in frustration. The division director is often in the middle, needing to understand departmental considerations while representing division faculty, who may feel they are overloaded with clinical care, covering day, night, and weekend hours.

Specific questions, each with important considerations for developing a model, include the following:

- How many hours should a faculty member work? This concept needs to be addressed at the local level. The suggestion of ~2100 hours annually used in one proposed model and supported by others is consistent with self-report of physician work time.³ However, center variation (perhaps specialty variation) has a role in establishing work expectations for a 1.0 FTE (eg, from 1920 hours/year [46 weeks @ 40 hours/week] to 2300 hours/year [46 weeks × 50 hours/week]).
- What percentage of those total work hours should be clinical for an academic neonatologist? The Clinical, Administrative, Research, Teaching, Service model has been presented as a way of tracking nonclinical activity. The clinical component of work allocation will depend on the needs of the division, nonclinical productivity, and extramural funding of the individual faculty member. In nonacademic settings, the clinical

hours would be expected to account for $\geq 90\%$ (often $\sim 100\%$) of professional time.

- What metrics can be used to incentivize both clinical and academic productivity? Metrics will vary depending on the setting, clinical expectations, and financial support. wRVUs may be useful in hospital-based medicine to assess overall productivity at a division level, but individual contributors (ie, those working nights) are clearly under-recognized if workload is only measured in this way. Recognition of individuals by number of hours (or nights/weekend service) contributing to the care of patients is a more accurate assessment. By adopting the concept of “unitization”, the divisional bonus may be distributed among its faculty based on work distribution as inpatient pediatrics is essential a consensus group effort, recognizing variations and productivity for each individual physician.
- How can clinical work be made equitable for all faculty when they have different work assignments in a complex, heterogeneous clinical service? If individuals are offered an opportunity to address different aspects of the clinical service, each activity must be valued and recognized. Identifying metrics for each clinical service in terms of hours needed, intensity of workload, and importance for patient care are vital for equity in faculty assignments.

Conclusion

Workload assessments and productivity for a hospital-based pediatrician may be calculated using a combination of time commitment and intensity of work. Revenue or wRVUs generated are affected by various factors, including season of work (winter vs summer), shift (night vs day), and location (level IV/III vs level II/I NICU). These factors highlight the difficulty in using measurement of wRVUs alone as the metric for productivity. The nonclinical hours of an academic pediatrician must be included in the FTE calculation. The Administrative, Research, Teaching, Service expectations need uniform metrics, including measures of productivity. Diversity, gender equity, and work–life balance must be considered when calculating the FTE expectations to ensure the well-being of the inpatient pediatric workforce of the future. ■

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Table I. wRVUs generated by an in-house neonatologist during night shift vs day shift both with 3 admissions and 2 delivery room resuscitations (but the day shift gets credit for the 17 inpatients, which generally is not available for night shift physician)

Code	Description	wRVU per unit	Day shift	Total wRVU	Night shift	Total wRVU
99465	Delivery room resuscitation	2.93	2	5.86	2	5.86
99468	Initial critical care	18.46	1	18.46	1	18.46
99469	Subsequent critical care	7.99	9	71.91	0	0
99477	Initial intensive care	7	2	14	2	14
99479	Subsequent intensive care	2.5	8	20	0	0
99239	Discharge	1.9	3	5.7	0	0
	Total			135.93		38.32

Table II. Available hours per clinical FTE

Categories	Hours
Total hours per year (40 hours/week × 52 weeks/year)	2080
Vacation time (22 working days × 8 hours/day)	176
Holidays (11 days/year)	88
Academic, research, teaching, administrative, continuing medical education (45 days)	360
Clinical hours available per year	1456

Table III. One minus clinical, administrative, research, and teaching (CART) model

Categories	Description
Overall FTE	1.0 (full-time) Fraction (part-time)
Base protected time	0.1 Clinician educator series 0.2 Clinician, educator, and researcher series 0.75 K-series researcher (see under research) University support \$/total salary \$ – tenured investigators
Subtract	
Clinical	Inpatient service (0.04 FTE/week for day shift and 0.045 FTE/week for night shift) Outpatient clinics (409 clinics [4-hour sessions] = 1.0 FTE)
Administrative	Salary support from the medical center or school of medicine/total salary
Research	Support from federal/state grants; research time promised as part of startup; cost sharing (if approved by chair)
Teaching	Formal teaching role financially supported by the School of Medicine
Service or strategy development	Institutional Review Board membership; university promotions committee; mentoring academy

Table IV. Worksheet to calculate service requirements of a physician-scientist developing a pulmonary hypertension program

1. What is your total FTE – full time = 1.0; part-time = a fraction based on your contract –1.0–
2. Protected time:
 - a. Are you a tenured physician with a “state/funded” payment from the University **No**
 - i. No: Clinician-educator-researcher track 20% of your total FTE = **-0.2–**
 - ii. Special start-up package deals (Pediatric pulmonary hypertension program development) **0.1_**
3. Research: National Institutes of Health/other funded researchers
 - i. % effort listed on your grant–**0**
 - ii. Cost-sharing arrangement–none
4. Administration time
 - a. Hours covered by \$ from hospital/medical center as % FTE director of respiratory care (5% effort) **-0.05**
5. Teaching–**0**
 - a. Regular clinic/rounds based teaching and occasional lectures for residents and fellows is part of your basic responsibilities
 - b. Note: Roles such as fellowship or residency program director or student clerkship director come with support based on number of trainees
6. Clinical time (1 minus all items mentioned above) **-0.65**
 - a. Day-shift service weeks–11 ($0.04 \times 11 = 0.44$)
 - b. Night-shift service weeks–4 ($0.045 \times 4 = 0.18$)
 - c. Outpatient pulmonary hypertension clinics (12/year) = 0.03
7. Other activities: advocacy, community service, scheduling, grand rounds, etc –**0**
8. Total of all these activities should be equal to your FTE **-1.0**