BRIEF
REPORTS

Resident Duty Hour Changes: Impact in the Patient-Centered Medical Home

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BACKGROUND AND OBJECTIVES: Family medicine residency programs are challenged with balancing hospital-based training with a longitudinal primary care continuity experience. In response to the Preparing the Personal Physician for Practice (P4) Initiative, the University of Missouri (MU) Family Medicine Residency Program sought to increase the presence of its residents in their continuity clinic, ie, the patient-centered medical home (PCMH). While initially successful, these efforts encountered formidable barriers with the July 2011 duty hour regulations from the Accreditation Council for Graduate Medical Education (ACGME).

METHODS: PCMH hours and visit numbers were collected and analyzed for MU residents from July 2005 through June 2012.

RESULTS: Comparing the 2 years before the P4 schedule changes to the first 3 years after the P4 changes, MU first-year residents experienced a 27% increase in patient visits with a 13% increase in hours. In the subsequent 2 years, which incorporated compliance with the new ACGME regulations, first-year residents experienced a 33% decrease in visits with a 25% decrease in hours. This negated the increases seen with the previous P4 schedule changes, and residents in all years of training experienced less visits, less hours, and less visits per hour.

CONCLUSIONS: New duty hour regulations not only limit the time resident physicians spend in the hospital but also their experience in the ambulatory setting. Considering the emphasis family medicine training programs place on continuity of care and the PCMH, the new regulations will have significant implications for these programs.

(Fam Med 2014;46(6):463-6.)

Two prominent current issues in family medicine residency training are the patient-centered medical home (PCMH) and the 2011 residency duty hour regulations instituted by the Accreditation Council for Graduate Medical Education (ACGME).[1] A central tenet of the PCMH concept is improved accessibility and communication between the patient and health care provider. Several of the 14 residency programs participating in the Preparing the Personal Physician for Practice (P4) Initiative emphasized this goal.[2,3] The University of Missouri's P4 plan aimed to immerse family medicine residents in the PCMH (their continuity clinic) early in their training. In July 2007, University of Missouri (MU) family medicine first-year residents were scheduled for 10%–20% more hours in the PCMH, compared to previous first-year residents. This required significant changes in hospital service coverage, rotation requirements, and faculty time, but resident focus groups revealed widespread agreement that these changes were worthwhile.[4]

During the 5-year P4 timeframe (2007–2012), the ACGME introduced several changes in resident physician duty hour limits, which became official in July 2011.[1] New shift time maximums necessitated a night team schedule for several rotations at MU. During these new weeks on night teams, the residents cannot have hours scheduled in the PCMH. This and other new guidelines had a net effect of eliminating post-call clinics and decreasing work hours in both the inpatient and outpatient settings. Such a decrease was also reported with the previous ACGME duty hour limits instituted in 2003.[5]

Due to the complexity of scheduling 36 residents in a large academic health system and a separate rural hospital, the MU Residency Program began instituting changes during the 2010–2011 academic year, in anticipation of the new regulations. This created three distinct periods for

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comparison of PCMH hours and visit numbers. The first period precedes the P4-inspired efforts to increase time in the PCMH. The second period is the first 3 years of P4, 2007–2010, when these efforts were first implemented. The final period is the last 2 years of P4, 2010–2012, affected by the new ACGME regulations.

Methods

Resident physician hours and visit numbers in the continuity clinic are routinely collected and analyzed as required by the ACGME Family Medicine Residency Review Committee. These data are collected directly from electronic appointment records that only count patients who checked in for appointments, excluding cancelations, missed appointments, and group visits. Annual data were analyzed for the July 1–June 30 academic period for 2005–2007 (pre-P4), 2007–2010 (P4 prior to consideration of the new ACGME guidelines), and 2010–2012 (P4 after the new ACGME schedule). Residents who were absent for 2 or more months in a year (due to leave, away rotations, etc) were excluded for that year; this resulted in exclusion of less than 3% of total resident hours over the study period. Mean values for annual hours and visits per resident, stratified by year of training, were compared using independent *t* tests with SPSS software.[6] All data met criteria for normal distribution. The P4 project was reviewed by the University of Missouri Medical School's Institutional Review Board and deemed exempt.

Results

Figure 1 shows the mean hours and visit numbers for first-year residents during the three different scheduling periods. The initial P4 scheduling changes yielded a 27% increase in patient visits with only a 13% increase in PCMH hours. First-year residents not only saw more patients, but there was a trend toward higher productivity (increasing from 1.3 to 1.4 visits per hour). Several first-year residents each year saw over 500 patients during this period, and they were pleased with their increased presence in the PCMH.[4]

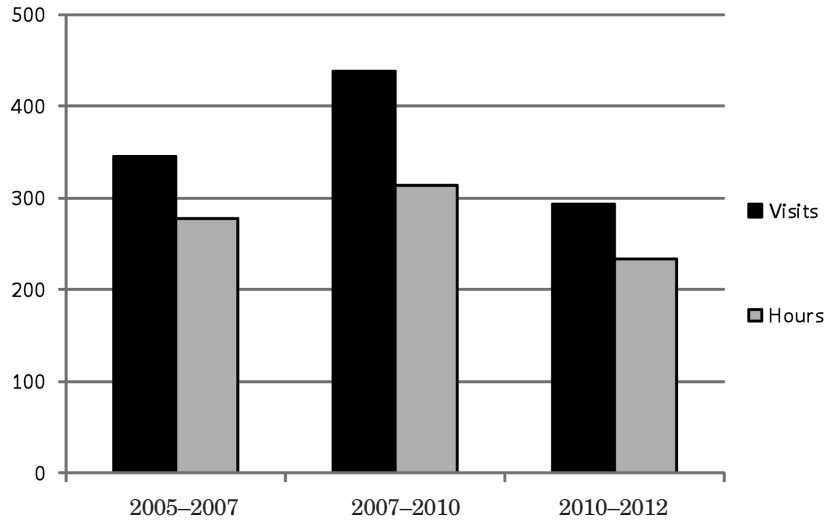
After the next iteration of schedule changes began in 2010 to comply with the imminent 2011 ACGME limits, patient visits to first-year residents in the PCMH decreased by 33%, with a 25% decrease in PCMH hours. First-year residents not only saw fewer patients, but they were significantly less productive (decreasing from 1.40 to 1.25 visits per scheduled hour [Table 1]). The most patient visits recorded by a first-year resident in this period were 340.

Figure 2 illustrates the overall effect on the residency. First-year residents demonstrated the most dramatic differences in both visits and hours, due to the targeted P4 schedule changes and the new hours guidelines, which are more restrictive for first-year residents. However, residents in all years of training experienced a decrease in PCMH visits, hours, and visits per scheduled hour (Table 1). The net effect over this 7-year period was a decrease, rather than an increase, in PCMH hours and visits comparing the pre-P4 period to the end of the P4 period. Overall, the new schedule has produced over 4,000 less visits annually for the entire residency, which is equivalent to (if not greater than) the loss of an established full-time office-based primary care physician.[7]

Discussion

This report details the inverse effects of two separate residency schedule interventions, the latter of which completely negated the former. No other significant changes in our PCMH environment occurred during this study period, and this created an opportunity to study the effects of the ACGME regulations on our P4 efforts. While it is not surprising that fewer hours led to less visits, this reduction in outpatient hours is a presumably unintended consequence of the new ACGME guidelines. Further, a disproportionately greater increase in visits occurred when hours increased, and a disproportionately greater decrease

Figure 1: Men Annual Clinic Hours and Visits for First-Year Residents, July 2005–June 2012



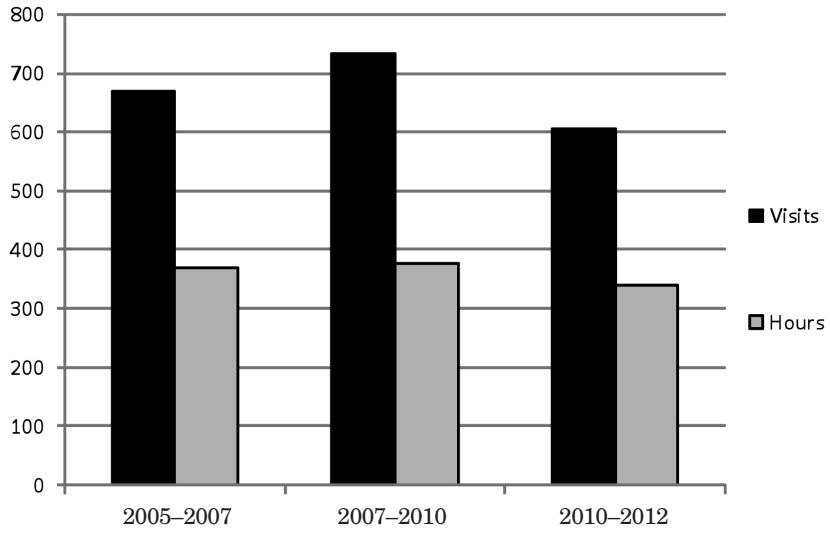
	Cohort 1: Years 2005–2007 (Pre-P4	Cohort 2: Years 2007–2010 (P4, Prior to New Hours	Cohort 3: Years 2010–2012 P4, After New Hours
Mean visits	345.4	437.9	293.0
Mean hours	278.2	313.4	233.7

Table 1: Mean Visits Per Scheduled Hour During P4 Period, 2007–2012

	Prior to New Hours Guidelines (Visits/Scheduled Hour)	After New Hours Guidelines (Visits/ Scheduled Hour)	Relative Decrease (%)
First-year residents	1.40	1.25	10.2
Second-year residents	2.05	1.84	9.9
Third-year residents	2.29	2.04	11.1

All means significantly different before and after new hours guidelines ($P<.005$)

Figure 2: Mean Annual Clinic Hours and Visits for All Residents, July 2005–June 2012



	Cohort 1: Years 2005–2007 (Pre-P4	Cohort 2: Years 2007–2010 (P4, Prior to New Hours	Cohort 3: Years 2010–2012 P4, After New Hours
Mean visits	669.5	732.9	605.1
Mean hours	368.3	377.8	338.8

Mean visits and hours for Cohorts 2 and 3 significantly different ($P<.01$)

in visits occurred when hours decreased. Resident focus groups commented on this phenomenon and emphasized the importance of establishing a relationship with a patient panel as early as possible, since the appointment "no-show" rate is highest for patients who do not know the scheduled provider.[4] Although not directly measured in this study, continuity of care would likely diminish with less physician availability and higher no-show rates.

The new ACGME guidelines seek to improve patient safety by reducing physician fatigue, but the threshold at which such improvement occurs is debatable.[8-10] Several recent studies report increased patient "handoffs" between providers, no evidence of improved patient safety, and educational shortcomings related to the ACGME guidelines.[9-16] Most of these reports focus on hospital care, but this project demonstrates a significant effect on outpatient training, where family medicine residents learn to value and master PCMH concepts. An extensive literature search (updated in July 2013) revealed no other reports on this outpatient impact to date.

The effects of this new resident schedule on patient care, educational quality, and financial sustainability have resulted in extensive discussions about future changes within the residency program (Table 2). An informal poll of other program directors in the P4 Initiative revealed a variety of changes, including lengthening of training, reduction of hospital coverage, and a collaborative approach with other providers such as nurse partners. Other residency programs are likely facing similar dilemmas, and they may not have the flexibility to consider some of the solutions in Table 2. As they currently stand, the new ACGME regulations may have as profound an impact on outpatient care training as they will on hospital training, particularly for family medicine residency programs.

ACKNOWLEDGMENTS: Member program, Preparing the Personal Physician for Practice (P4) Initiative. Portions of this paper were presented at the 2012 Society of Teachers of Family Medicine (STFM) Annual Spring Conference in Seattle, and the 2013 STFM Annual Spring Conference in Baltimore.

This effort was part of a larger innovation plan selected by the Preparing the Personal Physician for Practice (P4) Project, jointly sponsored by the American Board of Family Medicine Foundation and the Association of Family Medicine Residency Directors.

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References

1. http://www.acgme.org/acgmeweb/Portals/0/dh_dutyhoursCommonPR07012007.pdf. Accessed August 2, 2013.
2. Carney PA, Eiff MP, Green LA, et al. Preparing the personal physician for practice (P4): site-specific innovations, hypotheses, and measures at baseline. Fam Med 2011;43(7):464-71.
3. Carney PA, Eiff MP, Saultz JW. Assessing the impact of innovative training of family physicians for the patient-centered medical home. J Grad Med Educ 2012;4:16-22.

Table 2: Potential Changes to Address Decreased Resident Time in the PCMH

Change	Potential Challenges and Drawbacks
Adding more outpatient attending physicians and available clinic half days for resident continuity clinics	Decreased PCMH time for attending physicians; more nursing and ancillary staff needs
Full-time clinic "elective" rotations	Reduction in other elective rotation options; potential access problems for patients after the clinic elective ends and appointment slots diminish
Limiting the number of residents at one of our rural continuity clinics with the lowest patient volume	Further reduction in health care access for an area already facing a provider shortage
Increased "virtual presence" via electronic communication, or collaborative practice with other providers	May not be an acceptable substitute for face to face or phone encounters; does not count toward the Residency Review Committee's required number of patient visits
Less residents on inpatient service	Inpatient census has significantly increased in last decade, consistent with national trends[12]
Decreased didactics (seminars, lectures, workshops)	Residents value the current "protected" weekly half-day didactic schedule
Expansion to 4-year residency program	Scheduling complexity; applicant interest; potential graduate medical education funding cuts
More appointment slots per hour	Less available time for teaching in between patients; less time per patient; may diminish care quality and patient satisfaction

4. Lindbloom EJ, Ringdahl E, Deane K. Early immersion in the patient-centered medical home: a focus group study of resident physicians (abstract presented at the 2010 North American Primary Care Research Group Annual Meeting in Seattle, WA). Fam Med 2011;43(S1):8.
5. Lesko S, Hughes L, Fitch W, Pauwels J. Ten-year trends in family medicine residency productivity and staffing: impact of electronic health records, resident duty hours, and the medical home. Fam Med 2012;44(2):83-9.
6. IBM SPSS Statistics, Version 20, Release 20.0.0.
7. Petterson SM, Liaw WR, Phillips RL, Rabin DL, Meyers DS, Bazemore AW. Projecting US primary care physician workforce needs: 2010-2025. Ann Fam Med 2012;10(6):503-9.
8. Baldwin K, Namdari S, Donegan D, Kamath AF, Mehta S. Early effects of resident work-hour restrictions on patient safety: a systematic review and plea for improved studies. J Bone Joint Surg 2011;93(2):e5.
9. Peets A, Ayas NT. Restricting resident work hours: the good, the bad, and the ugly. Crit Care Med 2012;40(3):960-6.
10. Volpp KG, Friedman W, Romano PS, Rosen A, Silber JH. Residency training at a crossroads: duty-hour standards 2010. Ann Intern Med 2010;153(12):826-8.
11. Fitzgibbons SC, Chen J, Jagsi R, Weinstein D. Long-term follow-up on the educational impact of ACGME duty hour limits: a pre-post survey study. Ann Surg 2012;256(6):1108-12.
12. Desai SV, Feldman L, Brown L, et al. Effect of the 2011 vs 2003 Duty Hour Regulation—compliant models on sleep duration, trainee education, and continuity of patient care among internal medicine house staff: a randomized trial. JAMA Intern Med 2013;173(8):649-655
13. Goitein L, Ludmerer KM. Resident workload—let's treat the disease, not just the symptom. JAMA Intern Med 2013;173(8):655-6.
14. Sen S, Kranzler HR, Didwania AK, et al. Effects of the 2011 Duty Hour Reforms on interns and their patients: a prospective longitudinal cohort study. JAMA Intern Med 2013;173(8):657-62.
15. O'Malley PG. Reconciling the work, the learning, and the hours. JAMA Intern Med 2013;173(8):663.
16. Choma NN, Vasilevskis EE, Sponsler KC, Hathaway J, Kripalani S. Effect of the ACGME 16-hour rule on efficiency and quality of care: Duty Hours 2.0. JAMA Intern Med 2013;173(9):819-21.