

The Impact of Changing From a 6+2 to a 3+1 Residency Block Schedule on Patient Access and Other Outcomes

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ABSTRACT

Background The “X+Y” residency scheduling model includes “X” weeks of uninterrupted inpatient or subspecialty rotations, followed by “Y” week(s) of uninterrupted outpatient rotations. The optimal ratio of X to Y is unclear.

Objective Determine the impact of moving from a 6+2 to a 3+1 schedule on patient access to care, perceived quality of care, and resident/faculty satisfaction.

Methods Our residency program switched from a 6+2 to a 3+1 scheduling model in July 2018. We measured access to care before and after the change using the “third next available” (TNA) metric. In June 2019, we administered a voluntary, anonymous, 20-item survey to residents, staff, and faculty who worked in resident clinic in both the 6+2 and 3+1 years.

Results Patient access to appointments with their resident physician, as measured by TNA, improved significantly after the schedule change (mean 34.1 days in 6+2, mean 26.5 days in 3+1, $P<.0001$). Fifteen of 17 (88%) eligible residents and 13 of 24 (54%) faculty/staff filled out the voluntary anonymous survey. Surveyed residents and faculty/staff had concordant perception that the schedule change led to improvement in patient continuity, quality of care, and ability of residents to follow up on diagnostic tests and have regular interaction with clinic attendings. However, residents did not report a change in satisfaction with continuity clinic.

Conclusions Changing from a 6+2 to a 3+1 schedule was associated with improvement in patient access to care. Residents and faculty/staff perceived that this schedule change improved several aspects of patient care.

Introduction

In 2009, the Accreditation Council for Graduate Medical Education (ACGME) tasked internal medicine residency programs with increasing ambulatory training time and developing strategies to reduce conflict between inpatient and outpatient duties.^{1,2} In response, many programs switched from a traditional model of a half-day of clinic per week throughout residency, to a block model known as “X+Y” scheduling. In the block model, residents have “X” weeks of uninterrupted inpatient or subspecialty rotations, followed by “Y” week(s) of uninterrupted outpatient rotations.

The move from a traditional model to a block model has been associated with reduced conflict between inpatient and outpatient responsibilities, improved resident satisfaction in clinic, and an increase in available ambulatory training time.^{3,4} Patient continuity with their resident physician for chronic disease management appears

to be largely preserved in the block schedule^{3,5}; however, there may be a reduction in resident physician’s continuity with their patients, as the patient may require interval visits between blocks to manage acute medical issues. There has not been a consistent trend in studies of clinic model type and patient satisfaction, number of residents pursuing primary care, or patient outcomes.^{3,4,6} We are not aware of any prior studies investigating the impact of residency clinic model on timely patient access to care.

By 2015, around half of all programs were using block scheduling^{7,8}; however, there is considerable heterogeneity in the length and ratio of X and Y experiences employed. In the published literature, there are programs using a 4+1 block schedule,⁹⁻¹¹ 6+2,¹² 3+3,¹³ 4+4,¹⁴ and 8+4.¹⁵ The optimal ratio of X to Y remains unclear as there has not been a prior publication directly comparing one X+Y model to another.

At our program we changed from a 6+2 block schedule to a 3+1 block schedule in July 2018. We hypothesized that this change would result in an improvement in resident satisfaction with clinic and improvement in timely patient access to care.

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Editor’s Note: The online supplementary data contains the survey used in the study.

Methods

Setting and Participants

The University of Washington Boise Internal Medicine Residency is an academically affiliated, community-based residency program with 26 categorical residents and 4 preliminary interns. During the study, we had 2 main ambulatory training sites: A Veterans Affairs (VA) hospital-based ambulatory clinic that uses the patient aligned care team model and a Federally Qualified Health Center clinic. Residents in our program are assigned their own panel of continuity clinic patients, including transfers from graduating residents and new patients to clinic. Resident panel size is increased each year of training, starting at approximately 45 patients for a new intern, increasing to a target of 100 for a third-year resident. Residents are responsible for follow-up on test results and patient communication for their continuity clinic panel during clinic weeks, as well as when on other rotations. Outpatient clinic weeks include 5 half-days of continuity clinic, 3 half-days of subspecialty clinic, 1 administrative half-day, and 1 academic half-day. There were no changes made to resident responsibilities or half-days assigned to clinic during the “Y” week with our schedule change intervention.

Intervention

Prior to July 2018, our program featured a 6+2 schedule wherein residents spent 6 weeks of time on inpatient services or subspecialty electives, followed by 2 weeks on outpatient rotations that included their own continuity clinic half-days. In July 2018, our residency program moved to a 3+1 schedule with 3 weeks of inpatient or subspecialty rotations, followed by 1 week of outpatient care that included their own continuity clinic half-days. The 3+1 schedule created 4 cohorts of residents each academic year, while the scheduling in the 6+2 was more flexible and did not create fixed longitudinal cohorts. Along with the change to 3+1, scheduling for our pre-clinic teaching and weekly academic half-day also changed. Specifically, these teaching experiences changed from a format including new content each week, to a format using content repeated each week for 4 weeks.

Outcomes Measured

We measured patient access to care before and after the transition using the “third next available” (TNA) metric for each resident’s continuity clinic. The TNA is tracked for each physician and represents the time in days between when a patient calls for an appointment and when the physician has their third available appointment. The TNA is an industry standard

KEY POINTS

What Is Known

Increasing the frequency that residents are in primary care clinic holds potential for increasing patient access to timely appointments.

What Is New

The 3+1 scheduling improved “third next appointment” metrics compared to the prior 6+2 model in a single internal medicine residency program and was associated with improved perceptions of several aspects of care from residents and faculty.

Bottom Line

Changing from a 6+2 model to a 3+1 model was associated with improved time to receiving an appointment.

for measurement of patient access, because it is more sensitive to patient access than using the time until next available appointment, which could be confounded by circumstances such as patient cancellation.^{16,17} We measured TNA using 2 different data sources: an automatic measurement performed each calendar month stored in the VA’s Corporate Data Warehouse (CDW) and a manual count measured by administrative staff done at the midpoint of each calendar month. The automated CDW data did not include resident “evening clinics”; however, this data was captured in the manual counts. There was no difference in approach to evening clinic scheduling between years in the study. TNAs for July and August were purposefully omitted from the data in each year because clinic scheduling is atypical during these months as new interns join the facilities.

In addition to patient access, we tracked monthly clinic utilization, the number of continuity clinic patient visits completed by residents each year, the patient no-show rate, and the number of change-of-physician requests submitted by patients with residents as primary physicians. Access and metrics for attending physicians in the teaching clinic were collected as a control/balancing metric over the same time periods.

We created a voluntary, anonymous 20-item paper survey that was given to the residents who experienced both the 6+2 and the 3+1 schedule (ie, we excluded the interns and chief residents), resident clinic preceptors who worked with the residents during both years, and nurses who staffed the resident clinic during both years. The survey was developed by 2 of the authors (M.F.K., W.G.W) and tested on several faculty physicians before implementation. The survey included selected questions from the Learner’s Perceptions Survey for Primary Care,¹⁸ which has strong validity evidence for use with residents, and a single-item burnout question that has validity evidence for use with primary care physicians

and nurses.¹⁹ The survey also comprised questions based on local expertise and interest including perceptions of quality of patient care and satisfaction with clinic and clinic scheduling. The survey was administered in June 2019 in a retrospective look-back fashion where the participants were asked at the end of the second academic year to rate each item before and after the implementation of the 3+1 schedule.²⁰ Most of the survey responses used 5-point Likert-type scales. Our survey items and response options are provided in the online supplementary data.

Analysis of the Outcomes

Statistical analysis of the access and utilization metrics employed mixed linear analyses for repeated measures over time. To account for the longitudinal nature of the data, access metrics were analyzed using a mixed linear regression, with physicians nested within each month, and given months nested with an academic year. Survey data analysis used paired *t* tests, with a statistical significance set at $P < .05$, with no adjustment for multiple analyses. The sign test was used to confirm significance for survey data found to be non-parametric in nature. Data were analyzed using SAS software version 9.4 (SAS Institute Inc).

This project was reviewed by the Boise VA Institutional Review Board and was determined to be protected under quality improvement and thus exempt from full review.

Results

The data evaluating changes in access, clinical encounters, and no-show rates is from our VA residency clinic site where the majority of our residents (23 of 26) had their continuity clinic in both years of the study. We offered our survey to the 17 categorical residents in our program at both clinic sites who had experience with both the 6+2 and 3+1 schedules. We offered a similar version of the survey to 11 supervising attending physicians and 13 clinic staff members who had significant experience in both schedules. Fifteen of 17 (88%) residents completed the survey and 13 of 24 (54%) faculty/staff completed the survey (TABLE 1).

Patient access to care improved significantly after the change from the 6+2 to the 3+1 schedule (TABLE 2). Using the VA CDW metric, TNA improved from a mean of 34.1 days (95% CI 31.8-36.5) in the 6+2 schedule to a mean of 26.5 days (95% CI 24.9-28.2) in the 3+1 schedule ($P < .0001$). A similar pattern was seen in the manual count of access, which included intermittent resident evening clinics, with a mean of 32.7 days (95% CI 29.7-35.7) during 6+2 vs 22.6 days (95% CI 20.7-24.6) during 3+1 ($P < .0001$). There were more resident clinic patient care encounters in the 3+1 year than there were in the 6+2 year, which could account for some of this improvement, but this difference in encounter number was not significant ($P = .71$). There was no difference in access to care for patients cared for by attending physicians in

TABLE 1
Characteristics of Residency Program and Survey Respondents

Characteristics	2017-2018 (6+2)	2018-2019 (3+1)
Categorical internal medicine residents		
Total	26	26
PGY-1	9	9
PGY-2	8	9
PGY-3	9	8
Continuity clinic located at VA	23	23
Continuity clinic at FQHC	3	3
No. of residents who had experience in both 6+2 and 3+1, who were eligible for survey		17
Completed survey		15
Supervising attendings and staff		
Supervising attendings	11	11
Staff (including RN, LPN, MA)	13	13
Given survey (experienced in both 6+2 and 3+1)		24
Completed survey		13
Surveys completed by attendings		7
Surveys completed by staff		6

Abbreviations: PGY, postgraduate year; VA, Veterans Administration Medical Center Clinic; FQHC, Federally Qualified Health Center.

Note: The survey was administered in June 2019.

TABLE 2

Changes in Access, Clinic Encounters, and No-Show Rates Before and After Implementation of 3+1 Schedule

Metric	Before 3+1 Schedule	After 3+1 Schedule	Significance, ^a P value
Access, measured in days to third next available appointment			
Veterans Affairs data source			
Residents	34.1 (95% CI 31.8-36.5)	26.5 (95% CI 24.9-28.2)	<.0001
Attendings (control)	17.3 (95% CI 15.9-18.7)	17.0 (95% CI 15.4-18.6)	.72
Manual count			
Residents	32.7 (95% CI 29.7-35.7)	22.6 (95% CI 20.7-24.6)	<.0001
Primary care encounters (total annual)			
Residents	3410	3852	.71
No show rate (%)			
Residents	4.3 (95% CI 3.5-5.1)	4.4 (95% CI 3.7-5.0)	.65

^a Statistical analysis of the access metrics employed mixed linear analyses for repeated measures over time. To account for the longitudinal nature of the data, access metrics were analyzed using a mixed linear regression, with physicians nested within each month and given months nested with an academic year. Primary care encounters and no-show rate were summed over the academic year.

the same clinic between the 2 study years (17.3 days vs 17.0 days, $P=.72$). There was no significant difference seen in resident clinic utilization, no-show rates, or change of physician requests after the switch to 3+1.

Our survey data showed that both residents and faculty/staff perceived an improvement in patient access and continuity in resident clinic with the switch to the 3+1 schedule despite not having seen this data (TABLES 3 and 4). Residents and faculty/staff both perceived improvement in residents' ability to follow up on tests, provide high-quality care, and have regular interaction with attendings after the switch to 3+1. Neither residents nor faculty/staff perceived that residents were more satisfied in continuity clinic after the change to 3+1. There was no difference in resident or faculty/staff burnout after the change to 3+1 as measured by the 1-item burnout question.

Discussion

Changing from a 6+2 to a 3+1 resident clinic block schedule improved patient ability to access care with their resident physician by reducing the time to the TNA appointment by 7.6 days (a 23% reduction). Our residents and faculty/staff independently perceived improved patient continuity, improved ability to follow up on tests, improved quality of patient care, and more regular interaction with clinic faculty after the move to 3+1. Despite these positive changes, there was no difference in resident satisfaction with clinic or burnout after the move to 3+1.

To our knowledge, this is the first study of resident clinic scheduling that includes patient access to care as a primary outcome. Timely access to care is an important marker of quality for any high functioning health care system. Our study suggests that moving to an X+Y schedule with a shorter gap between clinic weeks can improve patient access to care without any apparent downsides in resident or faculty/staff perceptions of quality of care in clinic, educational environment in clinic, or well-being.

Much of the existing literature on residency clinic models has centered around the impact of scheduling changes on resident satisfaction in clinic, patient continuity of care with their resident physician, and residents pursuing careers in primary care.³⁻⁶ Prior studies have shown that moving from a traditional clinic schedule to an X+Y schedule is associated with improvement in resident satisfaction in clinic.^{3,4} We did not see any significant difference in resident satisfaction in clinic after moving from a 6+2 to a 3+1 schedule. We intended to compare continuity data between the 6+2 and 3+1 schedules in our study using the usual provider of care (UPC) metric, which measures patient continuity with their resident physician.²¹ Unfortunately, the database containing this data was not available and we were not able to obtain reliable continuity data for the 2-year period of our study. Notably, our residency clinic UPC continuity from 2014 to 2016 was 63.4% and from 2019 to 2023 it was 64.5%, which is comparable to the level of continuity seen in resident clinics with high-quality patient outcomes.²² We believe that it

TABLE 3

Survey Results From Residents (N=15)

Question	Before 3+1 Schedule	After 3+1 Schedule	Significance, ^a P value
	Mean (95% CI)		
Patient care ^b			
Patient access is appropriate	2.5 (2.1-2.9)	3.3 (3.0-3.7)	.0005
Patient continuity is adequate	2.6 (2.2-3.0)	3.5 (3.2-3.8)	.001
I am able to follow up on tests in a timely fashion	2.3 (1.7-2.8)	3 (2.5-3.5)	.004
Overall quality of patient care ^c	3.3 (2.9-3.7)	3.7 (3.3-4.1)	.02
I feel ownership of my patients	2.9 (2.6-3.2)	3.3 (1.9-3.6)	.06
My patients are satisfied with me as primary care physicians	2.9 (2.6-3.2)	3.3 (2.8-3.6)	.06
Education ^b			
Regular interaction with attendings	2.9 (2.4-3.4)	3.3 (3.0-3.7)	.03
Receive timely feedback from attendings	2.8 (2.3-3.3)	3 (2.5-3.5)	.25
Able to participate in team meetings	2.2 (1.7-2.7)	2.5 (1.9-3.1)	.38
Satisfied with continuity clinic experience	2.7 (2.4-2.9)	2.8 (2.4-3.2)	.63
Resident well-being ^b			
I am satisfied with my clinic schedule	2.4 (1.9-2.9)	2.6 (2.2-3.6)	.18
Good personal/professional life balance	2.3 (1.9-2.7)	2.6 (2.1-3.1)	.22
1-item burnout question (different scale ^d)	2.6 (2.0-3.2)	2.5 (1.9-3.2)	.68

^a Survey data analysis used paired *t* tests, with a statistical significance set at *P* < .05, with no adjustment for multiple analyses.^b Survey responses used a 5-point Likert scale, with 1=Strongly disagree, 2=Disagree, 3=Neither, 4=Agree, 5=Strongly agree.^c Perception of quality of patient care used a scale, with 1=Poor, 2=Fair, 3=Good, 4=Very good, 5=Excellent.^d The single-item burnout question used the previously validated question scale, with 1=No burnout to 5=Severe burnout.

was unlikely that the move to 3+1 affected continuity in our resident clinic. Finally, when designing this study we did not include residents pursuing primary care as an *a priori* outcome. Looking back now, more of our graduating third-year residents have entered primary care since the move to the 3+1 schedule but we are unsure if this was related to the schedule change or other factors.

This was a single-site study conducted at a specific residency program, which limits generalizability. The size of our residency is small to medium, and most of our residents have their clinic in a longstanding VA resident clinic. Our results may be less applicable to programs of different sizes, newer clinics, or clinics outside the VA. Data missingness was present in both objective methods of access measurement.

However, both manual and automated counts retained a consistent relationship during most of the academic year, suggesting that there was little variation during missing months. Additionally, residents and faculty/staff perceived an improvement in patient access to care with 3+1 despite not knowing these numerical results. There were more resident primary care encounters in the 3+1 year, though this difference was not statistically significant. This may have played a small role in the improvement in access to care, but given the small amount, it was unlikely to explain the magnitude of change in access. Our survey was administered with a retrospective survey design, which elicits perception of change in outcomes in the context of the fundamental change in clinic scheduling. There are merits and downsides to this approach. Since residents

TABLE 4

Survey Results From Faculty and Staff (N=13)

Question	Before 3+1 Schedule	After 3+1 Schedule	Significance, P value ^a
	Mean (95% CI)		
Patient care ^b			
Patient access is appropriate	2 (1.3-2.7)	3.6 (2.7-4.5)	.002
Patient continuity is adequate	2.8 (2.2-3.5)	4 (3.6-4.4)	.008
Residents are able to follow up on tests in a timely fashion	2.9 (2.3-3.5)	3.5 (3.0-4.0)	.03
Overall quality of patient care ^c	2.7 (2.1-3.2)	3.4 (3.1-3.7)	.02
Residents take ownership of patients	3.3 (2.6-3.9)	4.1 (3.6-4.6)	.008
Patients are satisfied with residents as PCPs	2.3 (1.8-2.7)	2.9 (2.7-3.1)	.03
Education ^b			
I have regular interaction with residents	3.6 (3.0-4.2)	4.3 (3.9-4.7)	.03
I can give timely feedback to residents	3.5 (2.9-4.1)	4.1 (3.7-4.5)	.13
Able to participate in team meetings	2.3 (1.3-3.2)	3.1 (2.0-4.1)	.06
Residents are satisfied with continuity clinic experience	1.9 (1.4-2.4)	2.3 (1.9-2.7)	.06
Faculty/staff well-being ^b			
I am satisfied with the resident schedule	2.3 (1.6-2.9)	3.2 (2.6-3.7)	.02
1-item burnout question (different scale ^d)	1.8 (1.3-2.2)	1.7 (1.3-2.1)	<.99

Abbreviation: PCP, primary care physician.

^a Survey data analysis used paired *t* tests, with a statistical significance set at *P*<.05, with no adjustment for multiple analyses.^b Survey responses used a 5-point Likert scale, with 1=Strongly disagree, 2=Disagree, 3=Neither, 4=Agree, 5=Strongly agree.^c Perception of quality of patient care used a scale, with 1=Poor, 2=Fair, 3=Good, 4=Very good, 5=Excellent.^d The single-item burnout question used the previously validated question scale, with 1=No burnout to 5=Severe burnout.

in later years of training during 3+1 were reflecting on an earlier year in training during 6+2, it is possible that residents misperceived maturational growth/skill as improvement due to the schedule change. We surveyed faculty/staff with a similar instrument since they would not be susceptible to this bias and, encouragingly, the results were similar between residents and faculty/staff. Finally, our study was focused on the impact of the schedule change on resident continuity clinic. We did not systematically investigate the impact of this schedule change intervention on inpatient rotations or electives.

Conclusions

In our residency program, moving from a 6+2 to a 3+1 block schedule led to improvement in patient

access to care and improvement in perceptions of the quality of care in resident clinic.

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