

## BRIEF REPORT

## Enhanced Scheduling to Improve Resident Continuity in a Family Medicine Teaching Clinic

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## ABSTRACT

**Background and Objectives:** Continuity of care is a core concept at the heart of primary care practices. Increased patient–provider continuity of care is associated with better satisfaction scores, better clinical outcomes, decreased hospitalizations and emergency department utilization, improved completion of preventive health services, adherence to medical treatment plans, and improved show rates. Compared to traditional outpatient practices, resident teaching clinics traditionally have lower rates of continuity and face unique challenges in improving continuity given the curricular demands, complex scheduling, and high turnover of providers. The objective of our study was to assess the impact of front office training and new electronic medical record (EMR) scheduling protocols on resident continuity in a family medicine teaching clinic.**Methods:** From July 2021 through May 2022, optimized scheduling through a provider search function in the EMR was implemented in a family medicine teaching clinic. We compared the monthly continuity rates between corresponding months in the prior year and the intervention year.**Results:** Over an 11-month implementation process, continuity for resident physicians increased from 36.4% to 64.6% ( $\chi^2=675.41$ ,  $P<.001$ ) using EMR tools and scheduling search functions to improve and sustain continuity over the study period.**Conclusions:** This intervention to enhance continuity in a family medicine residency clinic led to rapid and sustained improvement in provider continuity. This result demonstrates that optimization of EMR scheduling with tools and protocols can improve overall continuity. This scheduling process can likely be applied to clinical sites for residency programs across disciplines.

## INTRODUCTION

Interpersonal continuity (also known as patient–provider continuity) refers to a special type of continuity in which an ongoing personal relationship between the patient and clinician is characterized by personal trust and responsibility.<sup>1</sup> Increased patient–provider continuity of care is associated with better satisfaction scores, better clinical outcomes, decreased hospitalizations and emergency department utilization, improved completion of preventive health services, adherence to medical treatment plans, and improved show rates.<sup>2–5</sup> In residency ambulatory training, continuity of care is a common characteristic of high-performing teaching clinics and is considered a pillar of the Clinic First model.<sup>6</sup>

In family medicine residency training, the Accreditation Council for Graduate Medical Education (ACGME) emphasizes the importance of continuity of care as a guiding principle, stating that programs should strive to emphasize and improve con-

tinuity.<sup>7</sup> Additional specialties, such as pediatrics,<sup>8</sup> obstetrics and gynecology<sup>9</sup> and internal medicine,<sup>10</sup> also cite a continuity clinical experience as necessary for residency programs. Historically, rates of continuity in residency teaching clinics have been low,<sup>11,12</sup> citing the continuously evolving environment and the transient nature of residency.<sup>3</sup> A robust process for empanelment, fixed clinic days, open access scheduling, and increased appointment availability are strategies to improve resident continuity and have shown mixed impact on continuity and patient satisfaction.<sup>13–16</sup> However, minimal research exists on leveraging scheduling tools within the electronic medical record (EMR) to improve continuity. This strategy empowers front office and administrative staff as the overseers of continuity. This study examines how use of EMR scheduling tools can improve resident-centered continuity in a family medicine residency program.

## METHODS

The Center for Family Medicine–Greenville is an academic family medicine teaching clinic and serves as the continuity clinic for the Prisma Health/University of South Carolina School of Medicine–Greenville Family Medicine Residency Program. During the study period, the program had 19 residents and eight core faculty members. The patient panel for this clinic is approximately 44% White, 43% African American, 8.9% Hispanic, 1.5% biracial/multiracial, and comprises a payer mix that is 14.1% Medicare, 38.5% Medicaid, 30.8% private insurance, and 16.6% self-pay/charity care. At the time of this study, the residency program had 19 residents (52% male, 48% female) who provided care in 70% of the total annual visits in the clinic. Patients are empaneled to a resident annually, with residents maintaining their responsibilities as the primary care provider (PCP) up to graduation from the program. The resident is designated as the PCP in a specific field in the EMR. For this study, the continuity of care was measured using the continuity for physician (PHY) formula,<sup>11</sup> which is the number of appointments a physician has with their assigned patients over the physician's total number of appointments. This residency program uses Epic (Epic Systems Corp) for its outpatient clinic EMR. The methods described in this study use Epic functions to optimize systems to allow for maximum continuity.

The intervention to improve continuity involved the use of Auto Search in the EMR while scheduling patients for follow-up visits. Auto Search is a function in the appointment entry screen that can be selected to allow the person scheduling to see all available open slots for the chosen physician(s) during a certain period of time. Training for use of this tool occurred in May and June of 2021 for the clinic's front office staff as a part of two scheduled 1-hour meetings and training sessions for six front office team members. Training included defining continuity, outlining the importance of continuity, and setting expectations and goals for scheduling. Requested follow-up times during checkout, such as "follow up in 8 weeks," were adjusted to find provider availability within 2 weeks of a provider's request to help favor continuity; previously, any provider may have been chosen at the 8-week mark if the PCP was not available. This scheduling protocol was used for all resident and faculty physicians at the teaching clinic.

Clinician continuity was measured from July 2020 through May 2022. From July 2020 to June 2021, no intervention was applied, and these data are treated as control or baseline information regarding physician continuity. From July 2021 through May 2022, the study intervention was applied. We compared the monthly continuity rates between corresponding months in the control year and the intervention year—for example, comparing July 2020 to July 2021. We compared the annual continuity rate between the control and intervention years. We used statistical analysis with a  $\chi^2$  statistic including Bonferroni correction for multiple testing to compare continuity rates with a level of significance set at  $\alpha=0.05$ .

Statistical analysis was completed with SPSS Statistics for Windows, version 23.0. (IBM Corp). This study was considered exempt from the Prisma Health/University of South Carolina School of Medicine–Greenville Institutional Review Board.

## RESULTS

For a period of 11 months prior to the intervention, continuity was measured for 11,380 total resident physician visits with a baseline value of 46.2%. During the intervention period, 11,459 resident physician visits were included. Continuity improved from a mean of 46.2% at baseline to 60.9% ( $\chi^2=675.41$ ,  $P<.001$ ) during the study period (Table 1). Month-to-month comparison to baseline showed a significant and persistent improvement in continuity rates from September through May (Figure 1) during the intervention period. We found no significant change in July or August. Total provider continuity for the academic year improved for each postgraduate year (PGY) class: PGY-1 from 37.9% to 52.5%, PGY-2 from 47.9% to 58.5%, and PGY-3 from 46.9% to 64.8% (Table 2).

## DISCUSSION

This study has demonstrated that with practical optimization of scheduling within the EMR, resident physician continuity can be rapidly improved and sustained. Furthermore, these improvements were seen in a fairly short period of time, suggesting that they could be applied in residency program settings to quickly improve provider continuity. The rapid improvement in continuity occurred without significant adjustments to resident schedules or increased time in clinic, which are cited as common reasons for current challenges in improving and maintaining continuity.<sup>3</sup> Making modifications to the EMR, including fields to designate a resident as the primary care physician, yields a significant opportunity to improve the scheduling process and enhance continuity in outpatient residency clinics.<sup>17</sup> Note that this study assessed clinician continuity as opposed to patient-focused continuity, which is calculated with a different equation. Limitations of this study included lack of an external comparison group, continuity tracked in only one residency clinic, and use of a single EMR system. Additionally, this study reviewed an 11-month period and excluded a period of empanelment during which the listed PCP may be changed, which could alter the improved rates of continuity presented.

Future studies should look at the relationships between patient and provider satisfaction, quality metrics, and how similar protocols and optimization for other EMRs used in residency clinics can improve continuity for other residency programs with a continuity clinic experience.

## CONCLUSIONS

Continuity is a core pillar of primary care practice and should be an area included in graduate medical education. At present, continuity in residency clinics has been challenging to achieve in many graduate medical education settings. EMR modifications to enhance the search function for provider scheduling resulted in higher levels of continuity in a family medicine

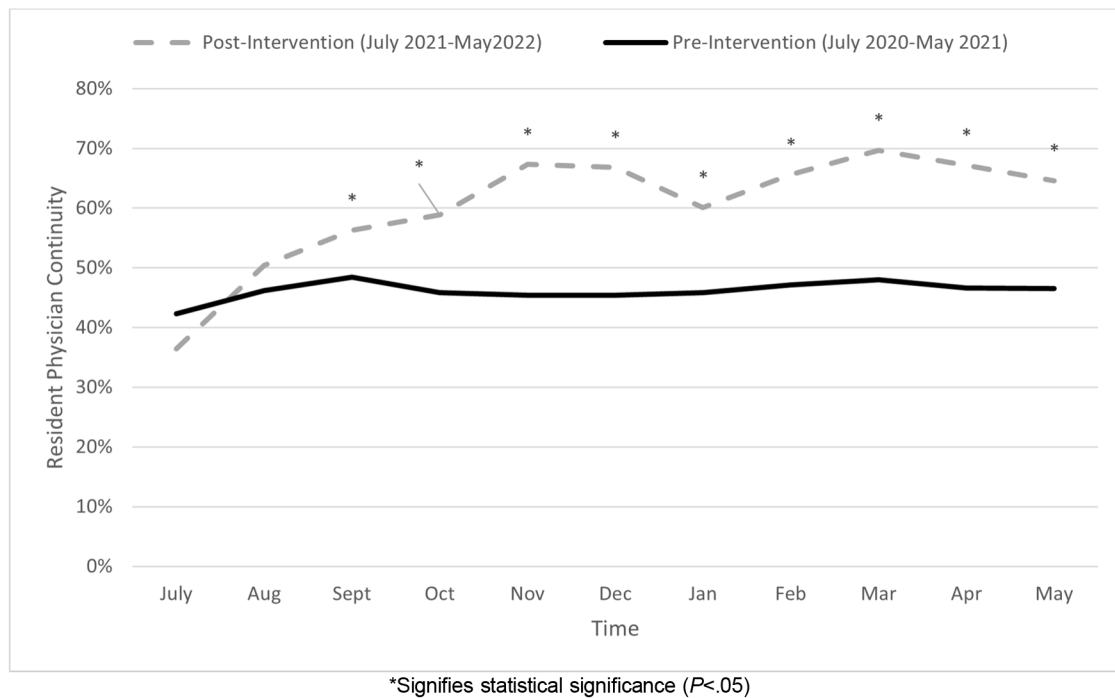
teaching clinic and could be applied to other outpatient settings with empaneled patient populations.

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**TABLE 1.** Resident Continuity Rates by Month

	Preintervention (July 2020–May 2021)		Postintervention (July 2021–May 2022)		P values
	Total visits	Clinician continuity %	Total visits	Clinician continuity %	
July	1,109	42.3	729	36.4	.47
Aug	1,050	46.2	1,181	50.4	.10
Sept	1,033	48.4	1,104	56.3	<.01
Oct	1,059	45.8	1,051	58.9	<.01
Nov	905	45.4	932	67.3	<.01
Dec	777	45.4	970	66.8	<.01
Jan	1,013	45.8	1,047	60.1	<.01
Feb	968	47.1	1,056	65.6	<.01
Mar	1,249	48.0	1,197	69.7	<.01
Apr	1,227	46.6	1,080	67.2	<.01
May	990	46.6	1,112	64.6	<.01
Annual	11,380	46.2	11,459	60.9	<.01

**FIGURE 1.** Trends in Resident Physician Continuity

**TABLE 2.** Resident Continuity by PGY Year Comparing Preintervention (July 2020–May 2021) and Postintervention (July 2021–May 2022)

Month	PGY-1			PGY-2			PGY-3		
	Preintervention % (n)	Postintervention % (n)	P value	Preintervention % (n)	Postintervention % (n)	P value	Preintervention % (n)	Postintervention % (n)	P value
July	19.7 (35/178)	25.5 (40/157)	.26	42.8 (177/414)	31.9 (75/235)	<.05	49.7 (254/517)	44.5 (150/337)	.40
August	29.9 (23/77)	35.0 (50/143)	.54	43.8 (192/438)	45.4 (203/447)	<.05	50.5 (270/535)	57.9 (342/591)	<.05
September	46.8 (51/109)	53.6 (37/69)	.71	45.3 (192/424)	55.1 (238/432)	.04	51.4 (257/500)	57.4 (346/603)	.12
October	38.2 (42/110)	61.7 (58/94)	<.05	44.8 (193/431)	51.5 (278/540)	<.05	48.3 (250/518)	67.9 (283/417)	<.05
November	36.1 (53/147)	65.1 (41/63)	<.05	51.5 (174/338)	64.1 (211/329)	<.05	43.8 (184/420)	69.4 (375/540)	<.05
December	38.1 (40/105)	56.5 (70/124)	<.05	46.3 (112/242)	70.1 (227/324)	<.05	46.7 (201/430)	67.2 (351/522)	<.05
January	35.7 (61/171)	53.5 (83/155)	<.05	45.0 (208/462)	67.3 (266/395)	<.05	51.3 (195/380)	56.3 (280/497)	.29
February	50.5 (55/109)	67.7 (65/96)	.06	46.2 (194/420)	51.7 (244/472)	<.05	47.2 (207/439)	78.7 (384/488)	<.05
March	39.6 (74/187)	69.9 (79/113)	<.05	54.2 (253/467)	65.6 (320/488)	<.05	45.9 (273/595)	73.0 (435/596)	<.05
April	39.6 (38/96)	56.9 (120/211)	<.05	51.9 (294/567)	74.9 (263/351)	.82	42.6 (240/564)	66.2 (343/518)	<.05
May	54.1 (53/98)	52.6 (71/135)	.97	54.3 (207/381)	63.4 (262/383)	<.05	39.3 (201/511)	68.9 (344/499)	<.05
Total	37.9 (525/1,387)	52.5 (714/1,360)	.05	47.9 (2,196/4,584)	58.5 (2,628/4,491)	<.05	46.9 (2,535/5,409)	64.8 (3,633/5,608)	<.05

Abbreviation: PGY, postgraduate year