The Ambulatory Long-Block: An Accreditation Council for Graduate Medical Education (ACGME) Educational Innovations Project (EIP)

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INTRODUCTION: Historical bias toward service-oriented inpatient graduate medical education experiences has hindered both resident education and care of patients in the ambulatory setting.

AIM: Describe and evaluate a residency redesign intended to improve the ambulatory experience for residents and patients.

SETTING: Categorical Internal Medicine resident ambulatory practice at the University of Cincinnati Academic Health Center.

PROGRAM DESCRIPTION: We created a year-long continuous ambulatory group-practice experience separated from traditional inpatient responsibilities called the long block as an Accreditation Council for Graduate Medical Education Educational Innovations Project. The practice adopted the Chronic Care Model and residents received extensive instruction in quality improvement and interprofessional teams.

PROGRAM EVALUATION: The long block was associated with significant increases in resident and patient satisfaction as well as improvement in multiple quality process and outcome measures. Continuity and no-show rates also improved.

DISCUSSION: An ambulatory long block can be associated with improvements in resident and patient satisfaction, quality measures, and no-show rates. Future research should be done to determine effects of the long block on education and patient care in the long term, and elucidate which aspects of the long block most contribute to improvement.

KEY WORDS: ambulatory education; clinic; residency training; chronic care model.

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BACKGROUND

The majority of health care in the United States occurs in the ambulatory setting, yet the focus of most Internal Medicine

graduate medical education remains inpatient-based.¹ This historical bias toward the inpatient setting has caused many Internal Medicine residents to view their ambulatory experience as a lower priority than inpatient medicine² and value their continuity clinic experience below other aspects of residency.³ Exposure to dysfunctional ambulatory settings early in training may foster negative attitudes about ambulatory practice that are difficult to change once formed.⁴ In addition, many residents receive little or no training in the management of chronic illness, and these skills are difficult and expensive to obtain after residency.^{5–7} The end result of these combined deficiencies has been characterized as the “training/practice gap”—few internal medicine graduates leave residency with the skills needed to function effectively in the ambulatory setting,⁸ and this may ultimately contribute to the unmet needs of patients⁹ as well as dissatisfaction with practice.

Many professional societies, including the American College of Physicians,² the Society of General Internal Medicine,¹⁰ and the Accreditation Council for Graduate Medical Education (ACGME),¹ have called for enhancing ambulatory education during residency training. In 2006, the ACGME-sponsored Educational Innovations Project (EIP)¹¹ provided flexibility with traditional accreditation requirements to 21 Internal Medicine residency training programs, encouraging the development of innovative models for training. At the University of Cincinnati Department of Internal Medicine, we have used our EIP to address the growing concerns regarding training in ambulatory care.

PROBLEM IDENTIFICATION

Our residency consists of 108 residents (69 categorical) based in a large academic health center. The categorical resident ambulatory practice is an urban safety-net practice located next to the main teaching hospital. Residents are responsible for approximately 19,000 ambulatory visits per year. A faculty practice with a similar case mix shares this space, but is a separate entity.

Historically, residents rated their ambulatory clinic experience low during exits interviews and surveys, reporting little time for learning in the ambulatory setting because of difficulty balancing ward and ambulatory duties. Many residents reported a lack of personal reward practicing in the ambulatory setting and found it less valuable than other aspects of the residency.

Continuity was poor in the resident practice. Before EIP implementation, residents spent an average of one half-day per

week in the ambulatory practice throughout 3 years of residency, unevenly distributed between 1 and 2 sessions per month on busy inpatient rotations to 12 sessions per month on elective rotations. The practice did not expect residents to be available to the staff or patients between their assigned half-day sessions, and residents did not routinely participate in practice improvement work.

Patients in the resident practice rated it below the faculty practice, despite the fact that the faculty practice was in the same building, and had a similar case mix. Resident patients were more likely to no-show for appointments than faculty patients. In addition, most resident quality process and outcome measures were worse than those of the faculty, and often below national standards.

GOALS FOR REDESIGN

We wanted to improve the ambulatory experience for our residents and patients. For residents, we wanted to reduce the conflict between inpatient and outpatient medicine, provide protected time for ambulatory learning, and improve the sense of satisfaction, reward, and value in ambulatory training. For patients, we wanted to improve satisfaction scores, increase rates of chronic illness care measures (diabetes, hypertension, preventative medicine), improve primary care physician-specific continuity, and decrease no-show rates.

EDUCATIONAL METHODS AND RATIONALE

In developing our model, our hypothesis was that 1 year of true continuity would be better for patient care and education than 3 years of more sporadic interactions. In our new model (Table 1), there are 3 types of residents—pre long block (postgraduate year [PGY]1/2), long block (PGY2/3), and post long block (PGY3). Pre-long-block PGY-1/2 residents rotate through a traditional mixture of inpatient services maintaining a fixed half-day (always on the same afternoon each week) of ambulatory clinic. PGY-1/2 residents are assigned smaller patient panels than in the past (15–30 patients, as opposed to 50–75). In addition, PGY-1/2 residents partner with long-block PGY-2/3 residents who cover their patients when they are not in the practice. From months 13–16, PGY-1/2 residents serve as senior residents on the inpatient services, maintain a weekly ambulatory clinic, and continue to partner with long-block residents.

The long-block begins in the 17th month of residency and continues through the 28th month for a total of 12 consecutive months. We chose this time because we felt it was important for

residents to consolidate their inpatient skills before the long block. Residents' transition from inpatient-based rotations to an expanded outpatient experience and patient panels expand to approximately 120 patients. Residents see patients in the ambulatory practice 3 half-days per week, but are required to be present in the practice (to answer messages, cover for their pre-long-block partner, etc.) at least once every day. Scheduling systems are designed to foster continuity of care. For example, each resident's daily schedule of 8 appointments has 2 slots protected for acute patients, and every effort is made to match these patients with their assigned physician. The residents' remaining time is spent on inpatient electives (e.g., cardiology or nephrology) or ambulatory electives (e.g., endocrinology or rheumatology) and research experiences with minimal overnight call (2 weeks of inpatient night float, plus approximately 1 inpatient day-float shift per month). Overall, ambulatory time is protected from service demands such as inpatient wards or intensive care units.

At the 29th month, long-block residents transition back to the inpatient services, turning their patient panel over to their pre-long-block partner. Residents are given the option of keeping a small portion of their patient panel for the final 8 months of their residency if they choose.

The year before our initial long-block implementation, we adopted the Chronic Care Model^{12,13} as a central operating philosophy through our participation in the Academic Chronic Care Collaborative.⁵ The Chronic Care Model is a primary-care based framework that identifies 4 essential interdependent components (information technology, delivery system design, decision support, and self management support) within the broader context of the community and health care system.^{14–17} The Model strives to create productive interactions between informed, activated patients, and prepared proactive health care teams.¹⁵

To achieve this in the resident practice we instituted a disease registry (PECSYS® 3.2) and began tracking over 20 process and outcome measures for diabetes, hypertension, and preventative care (information technology). We created weekly inter-professional team meetings (delivery system design) that include residents, faculty, nurses, social workers, pharmacists, administrators, office staff, and occasionally patients. The team uses data from the registry to create and prioritize improvement projects. We learned how to imbed evidence-based guidelines, such as insulin titration flow sheets, directly into daily workflow (decision support). Finally, we trained residents and staff in self-management support techniques and included self-management goal setting in our approach with patients. The faculty practice and the PGY-1/2 pre-long-block residents did not widely adopt these interventions.

One afternoon per week on the long block is reserved for team meetings, a quality improvement curriculum, and ambulatory education topics. During the quality improvement time residents receive practical instruction in improvement techniques. Residents also receive instruction in the Model for Improvement,¹⁸ and learn how to run Plan-Do-Study-Act cycles.

The entire team follows the aggregate clinical process and outcome measures in biweekly reports generated from the registry. Each resident receives a quarterly personal score and rank on each measure comparing his/her performance to peers and the group as a whole. Residents use these scores to prioritize personal and group-wide improvement projects.

Table 1 . Educational Innovations Project Curriculum Schedule

PGY 1 Months 1–12	PGY 2 Months 13–16	PGY 2/3	PGY 3
Wards, intensive care units, electives, fixed 1/2 day of clinic	Team leading, intensive care units, fixed 1/2 day of clinic	Ambulatory group practice, electives (the Long Block)	Return to inpatient-based rotations (can elect to keep a small ambulatory patient panel)

Table 2. Learner's Perception Survey—Comparison Cohort 1 PGY-2/3 Pre and Post Long Block*

	Before First Long Block	After First Long Block	Paired <i>t</i> test [†]
Time for learning	2.94	4.44	0.0004
Ability to focus in clinic without interruption	3.44	4.56	0.0057
Ability to balance ward/inpatient duties on clinic days	3.00	4.59	0.0018
Overall satisfaction with the learning environment	3.65	4.24	0.0075
Overall satisfaction with the clinical environment	3.44	4.33	0.0156
Personal reward from work	3.33	4.44	0.0042
Relationships with patients	4.06	4.72	0.0001
Sense of ownership and personal responsibility	3.72	4.78	0.0002
Rate the value of the continuity clinic experience	3.29	4.44	0.0006
Total experience (on scale of 0–100)	73.23	87.50	0.0016

*Scale: 1=very dissatisfied, 2=somewhat dissatisfied, 3=neither, 4=somewhat satisfied, 5=very satisfied

[†]As the results of the Lickert scale may not be normally distributed, we verified our analysis using the signed rank test and the *p* values were in agreement

The first 6 months of the ambulatory education curriculum covers conditions most commonly seen in the practice. After this, residents choose the topics they wish to review. Presenters are asked to utilize active learning techniques and to deliver practical information and skills that residents can take directly to the ambulatory practice.

EVALUATION

Multiple methods were used to evaluate our program. Resident satisfaction before and after initiation of the long block was measured using the Veteran's Administration Learners Perceptions Survey.¹⁹ An exemption from University of Cincinnati Institutional Review Board was obtained to administer this survey. Patient satisfaction was measured using publicly reported Press-Ganey® surveys, as well as a 10-question adaptation of the Consumer Assessment of Health Plans Study (CAHPS® Clinician & Group Survey—Adult Primary Care).^{20,21} As noted above, clinical outcome and quality measures were collected at each patient visit over 12 months. Continuity was evaluated using retrospective chart reviews. All physician contacts including visits, and telephone contacts were noted before the change (November 1, 2005 to October 31, 2006), and for the first 6 months after the change (November 1, 2006 to April 30, 2007). The number of contacts with the primary care provider was compared before and after the initiation of the long block. Each patient served as his own control and paired *t* tests were used for comparisons. Finally, we used our scheduling and billing software to determine no-show rates. Student's *t* tests, paired *t* tests, and Chi-square tests between pre and post long block data were used for comparisons where appropriate. SAS version 9.1 was used for all analyses, and a 2-sided *p* value of 0.05 was considered significant.

RESULTS

Resident satisfaction improved with the initiation of the long block (Table 2). The first cohort of residents to complete the long-block reported significantly more time for learning in the ambulatory setting compared with their pre-long-block experience, and also reported the long block improved their ability to focus in clinic without interruption. In addition, they reported increased personal reward from the work they were doing, a greater sense of relationship with patients, and increased ownership for patient care. Overall, residents who completed the long block in the initial cohort had significantly higher satisfaction scores for the learning and clinical environment, and rated the value of the continuity experience higher than when questioned before the long block. The second cohort of PGY-1/2 residents who had not yet entered their long block had similar views about the ambulatory practice as the first cohort of PGY1/2 residents at the start of the initial long block (Table 3).

Patient satisfaction also increased during the initial long block. Press-Ganey survey data, which had been relatively stagnant before 2005, increased for both the total practice score, and the provider specific scores (Table 4). Faculty scores, although higher at baseline, did not appreciably change.

Most quality process and outcome measures showed significant improvement, especially in the process prevention measures (Table 5). Pre-long-block PGY-1/2 residents in the first

Table 3. Learners Perception Survey—Comparison Cohort 1 and Cohort 2 Pre First and Second Long Block*

	Cohort 1 PGY-1/2 Before First Long Block	Cohort 2 PGY-1/2 Before Second Long Block	<i>t</i> test [†]
Time for learning	2.94	3.00	0.8670
Ability to focus in clinic without interruption	3.44	2.88	0.1715
Ability to balance ward/inpatient duties on clinic days	3.00	2.64	0.3708
Overall satisfaction with the learning environment	3.65	3.63	0.9222
Overall satisfaction with the clinical environment	3.44	3.68	0.3424
Personal Reward from work	3.33	4.04	0.0197
Relationships with patients	4.06	4.24	0.2959
Sense of ownership and personal responsibility	3.72	4.08	0.1772
Rate the value of the continuity clinic experience	3.29	3.63	0.1965
Total Experience (on scale of 0–100)	73.23	81.17	0.0318

*Scale: 1=very dissatisfied, 2=somewhat dissatisfied, 3=neither, 4=somewhat satisfied, 5=very satisfied

[†]As the results of the Lickert scale may not be normally distributed, we verified our analysis using the Kruskal-Wallis Test and the *p* values were in agreement

Table 4. Press-Ganey® Patient Satisfaction Survey Results

Year	Resident Practice			Faculty Practice		
	Number Answering Survey	Total Practice Score	Provider Specific Score	Number Answering Survey	Total Practice Score	Provider Specific Score
2005	208	78	80.7	126	86.3	91.6
2006	282	79.3	83.3	173	87.3	91
2007	247	80.7	84.5	170	86.8	89.5

and second cohorts had similar process measure rates when compared to those at the *start* of each long block. However, second cohort PGY-1/2 outcome measures (HbA_{1c}, blood pressure, low-density lipoprotein [LDL]) just before the second long block were similar to the first cohort resident data at the *end* of the initial long block.

Continuity within the resident practice improved overall. During the first 6 months of the long-block, patients had an additional 1.14 visits with their primary provider (2.47 vs 1.33 visits; $p < .0001$), and the percentage of visits with their primary provider increased from 75% of visits to 89% of visits ($p = .0029$). In addition, 0.53 more calls were answered by the primary

Table 5. Ambulatory Practice Report, October 31, 2007

	Goal %	Cohort 1 PGY-2/3 Initial Long Block Data December 1, 2006	Cohort 1 PGY-2/3 Final Long Block Data October 31, 2007	Cohort 1 PGY-2/3 Long Block Overall Percent Change (%)	Cohort 1 PGY-2/3 p value Initial versus Final Long Block Data	Cohort 2 PGY-1/2 Pre- Second Long Block Data October 31, 2007	p value comparing Cohort 2 PGY-1/2 to Cohort 1 PGY-2/3 Data October 31, 2007
Total number of patients		1907	2593	36		447	
Diabetes measures (31% of population)							
HbA _{1c} < 7.0%	60	43.8	47.7	9	0.192	48.4	0.886
Blood pressure < 130/80	40	37.9	47.1	24	0.002	48.5	0.774
Comprehensive foot exam in 1 year	90	35.7	59.7	67	<0.001	29.6	<0.001
2 HbA _{1c} s in 1 per year	90	58.1	48.4	-17	0.001	43.5	0.315
On ACE inhibitors or ARBs	75	76.6	80.3	5	0.130	74.5	0.141
On statins	60	64.7	70.6	9	0.034	58.2	0.006
LDL < 100 mg/dl	70	65	66.6	2	0.573	57.5	0.05
On aspirin	80	75.2	86.2	15	<0.001	63.3	<0.001
Pneumonia vaccination in 10 years	90	70.9	78.5	11	0.003	48.1	<0.001
Influenza vaccination in 1 year	90	64.1	50.9	-21	<0.001	38.9	0.014
Hypertension (58% of population)							
Blood pressure < 140/90	60	47.2	58	23	<0.001	61.6	0.312
LDL < 100 mg/dl	80	82.4	82.9	1	0.770	82.4	0.855
Prevention (all patients)							
Women > 42 with mammogram in 2 years	50	41.6	63.6	53	<0.001	38.8	<0.001
Patients > 51 with colonoscopy in 10 years	30	36.4	48.6	34	<0.001	27.7	<0.001
Women > 18 < 50 with pap smear in 3 years	30	7.7	61.7	701	<0.001	34.4	<0.001
Men 50-70 with PSA in 1 year	60	34.4	51.7	50	<0.001	29.7	<0.001
Tetanus vaccination in 10 years	60	27.9	59.9	115	<0.001	18.6	<0.001
Pneumonia vaccination in 10 years	90	64.6	83.3	29	<0.001	39.8	<0.001
Influenza vaccination in 1 year	90	54.5	46.6	-14	<0.001	29.3	<0.001
Women > 65 with DEXA in 5 years	60	10.1	54.2	437	<0.001	23.6	<0.001

Table 6. No Show Rates

Academic Year	Comment	Resident Practice No-show rate	Faculty Practice No-show rate
2002–2003	Pre-Work-Hours Restrictions	33.8	23.9
2003–2004	Work-Hours Restrictions Implemented	33.2	23.8
2004–2005	Pre-long Block	28.6	21.3
2005–2006	Chronic Care Model Implemented	28.2	18.7
2006–2007	First Long Block Implemented	26.1	18.6
June 2007 to October 2007	Second Year of Long Block	18.3	16.4
	<i>p</i> value for trend*	<0.0001	<0.0001

*The test for trend used was the Mantel-Haenszel Chi-Square

provider ($p=.0012$), a 43% increase. Overall, there was an 18.9% increase in the number of contacts patients had with their primary physician ($p<.0001$).

Over the course of the year, patient no-show rates for the entire resident practice dropped compared with historical controls (Table 6).

DISCUSSION

The conception and implementation of the long block was based on our perception of the inability of residents to deliver true continuity of care. We considered shorter block models (e.g., 2 months of inpatient medicine, followed by 1 month of ambulatory), but felt this would not match the reality of patient need and the unpredictable nature of illness. In a shorter block model, patients would have to be shared among teams of residents. Experience with panel sharing showed us that patients were often not able to correctly identify their primary physician, and residents did not always take ownership of a given patient's care for the same reason.

The patients in our urban safety-net practice have multiple chronic problems punctuated by periodic exacerbations. We felt that 1 primary care provider managing acute exacerbations of chronic disease (e.g., chronic obstructive disease) or intensifying therapy in uncontrolled disease (e.g. diabetes), setting a plan in motion, and arranging close follow-up would be more effective than multiple physicians attempting to do the same. We believe the ability to deliver this type of "burst continuity" was the most important difference between the faculty and resident practices before the long block. As resident physicians were better able to deliver true continuous care, gaps between resident and faculty patient satisfaction scores and no-show rates decreased, and residents' sense of reward and value increased.

Clinical quality measures also improved over the course of the initial long block. At first, we only followed the general team data, and the pace of change was slow. However, the long-block format allowed us to assign responsibility and accountability for a given population of patients to each resident. The personal quarterly scores and ranks on each measure allowed residents to identify areas of weakness. We believe personalizing feedback in this way motivated the residents to improve

more than any prior intervention, and accelerated the overall rate of improvement.²² It is interesting to note that the clinical quality measures for pre-long-block PGY-1/2 resident patients appeared to have been influenced by the practice of the long-block PGY-2/3 residents. In general, the quality process measures of the pre-long-block PGY-1/2 residents did not improve compared to the to the post-long-block PGY-2/3 data despite the PGY-1/2 residents being in the practice for 16 months, suggesting that exposure to the long-block curriculum was associated with improving process scores. However, most pre-long-block PGY-1/2 outcome measures (HbA_{1c}, blood pressure, LDL) were similar to the post-long-block PGY-2/3 outcome measures at the end of the first long block. These differences are likely influenced by several changes: the PGY-1/2 curriculum has significantly more content on outcome measures than process measures, delivery systems put in place for the long-block residents (e.g., nurse driven insulin titration program) affected the PGY-1/2 patients, and PGY-2/3 residents cross-covering PGY-1/2 residents may have focused more on outcome measures than process measures.

Several unintended consequences have resulted from implementation of our project. First, some attending physicians viewed the long block as an attempt to persuade residents toward careers in primary care by limiting exposure of residents to their subspecialties. For several of our subspecialty electives, we had difficulty matching ambulatory clinic schedules with consult attending rounds, and residents sporadically missed educational experiences. However, exit interviews with previous residents suggested this was also the case in our old model. Second, patients followed mainly by the PGY-1/2 residents did not receive the intense scrutiny of the long-block residents, and 2 levels of care developed. We are currently addressing this by exposing the PGY-1/2 residents earlier to chronic illness care concepts and by finding team-based ways to deliver process-based care. Third, the separation of ambulatory care from inpatient service was difficult, requiring reorganization of the inpatient teams, and an increase in hospitalist coverage at significant expense. The engagement of senior leadership within the hospital and academic health center was of paramount importance to cover these costs. Finally, as we are still early in the implementation of this innovation, the effect on patients of changing all the residents at the end of the long-block period is unknown.

LIMITATIONS

Our project and data have several limitations. First, we are reporting only on our first cohort's experience with the new curriculum and do not yet know if the results will be maintained. Second, continual accrual of patients into our registry limits comparison of pre-post measures to relative changes. Third, we changed many aspects of our practice simultaneously and therefore cannot conclusively determine which aspects of the change were responsible for which improvements in outcomes. Initiatives such as the long block are complex social and educational interventions for which the traditional experimental methods become less helpful.^{23–25} However, aspects of our intervention (Chronic Care Model, registry use, teams) do have support of evidence-based trials.²⁶ In addition, the PGY-1/2 residents and the faculty practice were not exposed to many of the interventions the PGY-2/3

residents were exposed to, and overall data for this population of residents and patients changed very little. Fourth, it is possible the increase in PGY-2/3 satisfaction, especially personal reward from work and improved sense of relationship, could be the natural progression for senior residents and not the result of the long block. We had no historical comparison data for junior and senior residents who finished the program before the implementation of the long block. Fifth, we could not separate out no-show rates, ED visit rates, or Press Ganey® scores for PGY-1/2 patients and PGY-2/3 long-block patients. However, the long-block PGY2/3 residents see most of the patients in the practice so the scores are weighted toward them. Finally, our specific model may not be generalizable to other residency programs. Not every program will be able to muster the resources needed for such a radical change, and concepts such as burst continuity may not be as meaningful in settings where the burden of chronic disease is low.

CONCLUSION

Our preliminary data suggest that an ambulatory long block can be associated with improvements in resident and patient satisfaction. In addition, our findings suggest that improved chronic illness care—as shown by process and outcome measures of diabetes, hypertension, and preventative care—can be attained in an Internal Medicine residency practice. Although it is difficult to tease out which aspects of our EIP were responsible for the improvements seen, we believe that the improved continuity between patient and doctor and between doctor and system was extremely important. Future research should be done to determine effects of the long block on education and patient care in the long term, and elucidate which aspects of the long block most contribute to improvement.

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