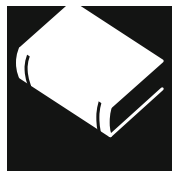


PERSPECTIVE



Improving Ambulatory Training in Internal Medicine: X + Y (or Why Not?)

Alaka Ray, MD¹, Danielle Jones, MD², Kerri Palamara, MD¹, Maryann Overland, MD³, and Kenneth P. Steinberg, MD³

¹Massachusetts General Hospital/Harvard Medical School, Boston, MA, USA; ²Emory University School of Medicine, Atlanta, GA, USA; ³University of Washington School of Medicine, Seattle, WA, USA.

The Accreditation Council for Graduate Medical Education (ACGME) requirement that internal medicine residents spend one-third of their training in an ambulatory setting has resulted in programmatic innovation across the country. The traditional weekly half-day clinic model has lost ground to the block or “X + Y” clinic model, which has gained in popularity for many reasons. Several disadvantages of the block model have been reported, however, and residency programs are caught between the threat of old and new challenges. We offer the perspectives of three large residency programs (University of Washington, Emory University, and Massachusetts General Hospital) that have successfully navigated scheduling challenges in our individual settings without implementing the block model. By sharing our innovative non-block models, we hope to demonstrate that programs can and should create the solution that fits their individual needs.

KEY WORDS: medical education; ambulatory training; resident continuity clinic; outpatient education; clinic scheduling.
J Gen Intern Med 31(12):1519–22
DOI: 10.1007/s11606-016-3808-x
© Society of General Internal Medicine 2016

Despite the Accreditation Council for Graduate Medical Education (ACGME) requirement that internal medicine residents spend one-third of their training in an ambulatory setting, graduates of internal medicine residency programs often report feeling more comfortable managing acute respiratory failure than an upper respiratory tract infection.¹ As residents gravitate toward careers in inpatient-oriented subspecialties or hospital medicine, one of the reasons may be that their education is centered primarily in these arenas. Even among programs that prioritize ambulatory education, striking a balance between inpatient and outpatient training can prove to be a daunting task.

The ambulatory learning model is a central component of this issue. Ambulatory education has traditionally involved a half-day continuity clinic once a week during inpatient, ICU,

elective, and consult blocks. This pattern is extraordinarily challenging for residents, faculty, clinic staff, and patients. Perhaps the most common complaint is that on clinic days, residents feel as though they have two full-time jobs to complete in one, duty-hour-restricted day: caring for their full inpatient service while also caring for their panel of primary care patients.

In 2009, the ACGME set a minimum of 130 half-day clinic sessions over 3 years, and required one-third of the training time to be spent in the ambulatory setting, to address the need for internists to be better trained in ambulatory medicine.² These targets were difficult for many programs to achieve within the limitations of the traditional clinic template, magnifying the challenges of this model. The ACGME concomitantly added that programs were required to create strategies to reduce the inpatient–outpatient tension felt by residents, but allowed programs to individually interpret this charge.

In order to achieve the above targets and minimize the conflict between inpatient and outpatient learning, innovative strategies emerged. The University of Cincinnati developed the ambulatory long-block system, with 12 continuous months of ambulatory training.³ Shalaby and colleagues at Lehigh Valley Medical Center developed a model with increasing popularity, often referred to as “block scheduling” or the “X + Y” model.^{4, 5} In fact, according to the annual survey administered in 2015 by the Society of General Internal Medicine Medical Resident Clinic Directors Interest Group, 62.5 % of respondents stated that they were using some version of the X + Y model. Residents in a block system spend “X” number of weeks (typically 3–8) on an inpatient rotation, followed by “Y” number of weeks (typically 1–2) in an ambulatory setting. During the ambulatory (Y) time, residents have continuity clinic (2–4 half-days) and specialty clinics, as well as the opportunity to have a dedicated ambulatory curriculum with didactics and other topics such as quality improvement (QI) and evidence-based medicine (EBM).^{6, 7}

As with any model, there are potential disadvantages, and new, unintended challenges may arise. The block model can lead to reduced resident–preceptor and resident–patient continuity when residents are absent for longer “X” time periods. On the inpatient side, the block model may reduce flexibility for larger residency programs with higher inpatient staffing needs. In this circumstance, there could be a net decrease in

Received February 26, 2016

Revised June 1, 2016

Accepted June 29, 2016

Published online July 20, 2016

the number of elective rotations, as these rotations are used to create the “Y” (ambulatory) time. Residents themselves may have less flexibility to make changes to rotations or call nights, as they may be restricted to switches within their cohort of ambulatory “Y” or firm/pod residents. Inpatient team continuity can be disrupted, and when inpatient rotations are shortened by 1 or 2 weeks, the rapid team turnover leads to increased handoffs, with higher potential for medical errors, less time for direct observation and longitudinal feedback by individual faculty, and higher evaluation burden on inpatient attendings.

Among programs that have not implemented X + Y scheduling, some have developed structures that have been successful alternatives to the traditional and block models. Our residency programs represent three such paradigms for reducing the tension between the inpatient and outpatient settings and increasing the time residents spend in clinic, without adopting an X + Y model. Of note, all three of our programs have independently approached clinic scheduling in an intensity-responsive way, such that clinics are more frequent during ambulatory blocks and/or elective time, moderately frequent during medium-intensity inpatient rotations, and less frequent during high-intensity rotations—an approach we have coined the “accordion model.” Table 1 shows some of the key characteristics of our programs and our clinic models.

The University of Washington (UW) has implemented a solution devised by their residents—the Full-Day Clinic plus

Immersion Block Model. In this structure, rather than going to clinic for a half-day once weekly, residents go to continuity clinic for a full day, with frequency following the accordion model. On inpatient admitting rotations, clinic is scheduled for 1–2 full days per month. On inpatient consult months and ambulatory electives, residents have a full day of continuity clinic each week. Further, the residents are assigned a “fixed day” in clinic, around which their inpatient call schedules are coordinated. Thus, residents are scheduled for clinic on their assigned day at least 50 % of the time, allowing for continuity with a clinic mentor and interprofessional teams. In addition, the program has also implemented ambulatory elective rotations and month-long primary care immersion blocks.

There are several potential advantages of this model. The first is an increase in time spent by residents in their continuity clinic and other ambulatory settings. At UW, residents have more than 150 half-day clinic sessions in 3 years, and the number for most primary care residents now exceeds 200. Residents are available for their clinic patients on a more regular and predictable basis, with little extended time away from clinic. By implementing ambulatory subspecialty and thematic blocks, net ambulatory time was increased while simultaneously expanding the number of elective rotations in the curriculum. The second advantage is that tension between inpatient and outpatient roles is minimized by the full-day clinic approach, as the difficult, rapid transition from acute inpatient medicine to outpatient medicine no longer occurs

Table 1 Three Accordion Models of Ambulatory Training by Program

	UW – Full-Day Clinic Model	Emory – Hybrid Model	MGH – Hybrid Model
No. residents	Categorical: 117 Primary care: 42 Preliminary: 12	Categorical: 150 Primary care: 22 Preliminary: N/A	Categorical: 123 Primary care: 21 Preliminary: 15
No. chief residents	11	6 (including one ambulatory chief resident)	4 (including one ambulatory chief resident)
No. elective rotations (inpatient and outpatient)	Prelim: 12 weeks PGY1: 6–8 weeks PGY2: 12–14 weeks PGY3: 12–18 weeks	Prelim: N/A PGY1: 0 weeks PGY2: 8 weeks PGY3: 4 weeks	Prelim: 12 weeks PGY1: 10 weeks PGY2: 10–12 weeks PGY3: 12–14 weeks
No. continuity clinic practice sites	9	2	14
Clinic model	Full-day, fixed-day continuity clinic schedule 1–2 full-day clinics during high-volume inpatient rotations	Half-day continuity clinic schedule with flexible scheduling Intensity-responsive scheduling of clinic during inpatient rotations (0–4 half-days per month)	Half-day continuity clinic schedule with flexible scheduling Intensity-responsive scheduling of clinic during inpatient rotations (1–4 per month)
No. ambulatory blocks	Increased continuity clinic during consult and elective blocks (1 full-day clinic weekly) in all 3 years 3 ambulatory block months <i>per year</i> (categorical track) 4–6 ambulatory block months <i>per year</i> (primary care track, depending on pathway) • Increased continuity clinics (1 full-day weekly)	Increased continuity clinic during elective blocks (2 half-days weekly) in PGY 2 and 3 years 5 ambulatory block months <i>over 3 years</i> (categorical track), 8 ambulatory block months <i>over 3 years</i> (primary care track) • Increased continuity clinics (4 half-days weekly)	Increased continuity clinic during elective blocks (1–2 half-days weekly) in all 3 years 3 ambulatory block months <i>per year</i> (categorical track) 3–4 ambulatory block months <i>per year</i> (primary care track) • Increased continuity clinics (2–3 half-days weekly)
No. faculty and administrative factors	Increased support from fellows on subspecialty elective rotations; increased selection of ambulatory subspecialty and thematic rotations	Increased support from fellows on certain specialty rotations*	Full-time effort of one administrative staff member is required. Ambulatory chief resident also assists with scheduling.

* With a multi-hospital system, Emory residents may need to travel between sites to reach their continuity clinic. In an agreement with our specialty divisions, residents and fellows are not required to round on consult patients prior to morning or after afternoon clinics. Residents and fellows, along with specialty faculty, provide coverage in these cases

within the same day. A resident spends an entire day in clinic, while the rest of the ward or specialty team cares for the inpatients. Third, residents are better integrated into the community of providers in their continuity clinics, leading to improved working relationships within their continuity clinic’s interprofessional care team. Residents are able to participate in clinic huddles, clinic educational conferences, and clinic social events without feeling the pull of inpatient responsibilities. Fourth, resident–preceptor continuity is largely preserved given the fixed-day structure.

Emory University School of Medicine (Emory) and Massachusetts General Hospital (MGH) approached the challenge of improving residents’ primary care experiences by implementing a hybrid model, which is a combination of the traditional weekly half-day clinic session and the X + Y model. Again, clinics are scheduled per the accordion model, with frequency expanding and contracting based on the intensity of their rotation. Similar to the UW model, ambulatory time was increased through the creation of ambulatory rotation time, which included ambulatory subspecialty electives so that overall elective time would not be reduced. At MGH, categorical residents have 9 ambulatory months scheduled over 3 years, and primary care residents have at least 10, while at Emory, categorical residents have 5 ambulatory months and primary care residents have 8.

By increasing continuity clinic sessions in ambulatory and elective blocks, MGH and Emory residents are able to easily meet, and usually exceed, the required 130 clinics over 3 years. Despite allowing residents to be in clinic on days other than their “assigned day,” MGH has found that preceptor–resident continuity remains above 50 %. This ensures that residents receive feedback and mentorship from a primary

preceptor with whom they develop a longitudinal relationship, while also allowing broader exposure to other teaching faculty in the clinic. MGH and Emory have also implemented a dedicated outpatient curriculum delivered during the ambulatory blocks. At both institutions, the curriculum is split into two levels so that intern learning sessions are separate from junior and senior resident conferences. The dedicated time allows delivery of skills-based workshops on a variety of topics including resident as teacher and women’s health, and procedures such as joint injection and aspiration.

Table 2 summarizes some of the advantages and disadvantages of these models. The hybrid model requires a detail-oriented administrator. MGH has a full-time administrative staff member who assists with clinic scheduling, ambulatory rotation, and elective scheduling, and provides evaluation support. Emory has split the tasks among several administrators to achieve the same goal. Schedules at all three programs must be analyzed for long gaps between clinics, and sessions are often manually added to resolve those gaps. The variability in number of residents on ambulatory rotations also requires more advanced planning for clinic administrators. In addition, the UW model results in residents being away from inpatient rotations for 2 full days, in addition to days off, and this has required increased flexibility and staffing in inpatient scheduling. While tension between inpatient and outpatient education has likely been reduced in all three programs, elimination of this conflict would require, on some level, a periodic, total exemption from clinic duties. Given the ongoing needs of primary care patients, our view is that residents should never be completely absent from their role as primary care physicians, and thus some tension remains.

Table 2 Advantages and Disadvantages by Clinic Model

	X + Y/Block Schedule	Hybrid Clinic Model (Emory and MGH)	University of Washington Full-Day Clinic Model
Inpatient–outpatient tension	(+) Decreased inpatient–outpatient tension (+) Numerous long gaps in residents’ outpatient presence	(+) Decreased inpatient–outpatient tension (–) Some inpatient–outpatient tension remains	(+) Decreased inpatient–outpatient tension (–) Some inpatient–outpatient tension remains
Predictability of clinic scheduling	(+) Highly predictable clinic scheduling (+) Clinic staffing more predictable	(+) Predictable clinic scheduling during ambulatory blocks (–) Variation in scheduling during inpatient blocks	(+) Predictable clinic scheduling during ambulatory blocks (–) Variation in scheduling during inpatient blocks
Ambulatory curriculum Continuity	(+) Reliably deliver protected ambulatory curriculum (–) Reported difficulties with patient-physician continuity	(+) Reliably deliver protected ambulatory curriculum (+) Patient-physician continuity preserved	(+) Reliably deliver protected ambulatory curriculum (+) Patient-physician continuity preserved
Team-based care	(+) Increased interaction with inter-professional teams during ambulatory time (–) Reliance on teams of resident physicians to provide continuity	(+) Increased interaction with inter-professional teams during ambulatory time	(+) Increased interaction with inter-professional teams during ambulatory time
Educational aspects	(+) Opportunity for dedicated ambulatory curriculum during blocks (–) Perceived emphasis on inpatient continuity and scheduling over outpatient continuity and individual panel ownership (–) Requires change in traditional weekly precepting model	(+) Opportunity for dedicated ambulatory curriculum during blocks (–) Residents maintain primary ownership of patients including follow up of results and response to patient calls	(+) Opportunity for dedicated ambulatory curriculum during blocks (–) Residents maintain primary ownership of patients including follow up of results and response to patient calls

(+) Denotes a possible advantage and (–) denotes a possible disadvantage

One of the greatest dilemmas in primary care education has been the notion of continuity of care, and this concept deserves mention here. Of the three programs described here, internal data is available on the 66 residents who practice at the largest academic primary care clinic at MGH. The percentage of patients who were seen by their own physician (continuity from the patient perspective) was 77 % for attendings and 70 % for residents. Meanwhile, the percentage of visits during which a provider saw their own patients (continuity from the physician's perspective) was 98 % for attending physicians and 82 % for resident physicians. The no-show rate was 16.5 % for residents and 5.4 % for attendings. These values were obtained after the model redesign, suggesting excellent continuity. In block scheduling models, the predictability of scheduling would seem conducive to similarly excellent continuity. However, in their study of 12 internal medicine programs, Francis et al. found that among three models (block, traditional, and combination/hybrid), although the block model had the best continuity of care from the patient perspective, the percentage of visits with the patient's own provider was only 57.4 %.⁸ The block model also had the lowest rates of providers seeing their own patients (continuity of care from the resident physician perspective), at 56.7 %.⁸ Thus, the assumption that transitioning to block scheduling will lead to an improvement in continuity for all programs bears further examination at the individual program level. Some programs that utilize block scheduling have addressed continuity by creating "pods" or "teams" of residents, and measuring continuity within the pod rather than per resident. Whether this approach is acceptable to patients or succeeds in meeting the educational objective of independent, ongoing primary care of a panel of patients remains to be seen.

No single scheduling system is better than another for all programs. Based on accumulating empirical and anecdotal evidence, the traditional half-day per week clinic model is fading and may be the least advantageous structure. We hope to demonstrate that programs can transform ambulatory education in many different ways, and ideally, residency programs should analyze their own needs so that innovative solutions

can harness the strengths of the program and avoid creating new and unexpected challenges. At our institutions, the block model was not adopted, as the potential negative impact on important aspects of our large programs was undesirable. Yet we have been able to successfully innovate toward the shared goals of maintaining clinic continuity, reducing the tension between outpatient and inpatient experiences, and expanding ambulatory training.

Corresponding Author: Alaka Ray, MD; Massachusetts General Hospital/Harvard Medical School, 15 Parkman Street, Wang 635, Boston, MA 02114, USA (e-mail: aray2@partners.org).

Compliance with Ethical Standards:

Conflict of Interest: The authors of this manuscript report no conflicts of interest.

REFERENCES

1. **Wiest FC, Ferris TG, Gokhale M, Campbell EG, Weissman JS, Blumenthal D.** Preparedness of internal medicine and family practice residents for treating common conditions. *JAMA*. 2002;288:2609–2614.
2. Accreditation Council for Graduate Medical Education. ACGME Program Requirements for Residency Education in Internal Medicine. Available at http://www.acgme.org/acgmeweb/Portals/0/PFAssets/ProgramRequirements/140_internal_medicine_07012015.pdf
3. **Warm EJ, Schauer DP, Diers T, et al.** The Ambulatory Long-Block: An Accreditation Council for Graduate Medical Education (ACGME) Educational Innovations Project (EIP). *J Gen Intern Med*. 2008;23(7):921–926.
4. **Mariotti JL, Shalaby M, Fitzgibbons JP.** The 4:1 schedule: a novel template for internal medicine residencies. *J Grad Med Educ*. 2010;2:541–547.
5. **Shalaby M, Yaich S, Donnelly J, Chippendale R, DeOliveira MC, Noronha C.** X+Y Scheduling Models for Internal Medicine Residency Programs—A Look Back and a Look Forward. *J Grad Med Educ*. 2014;6(4):639–642.
6. **Zafar MA, Diers T, Schauer DP, Warm EJ.** Connecting resident education to patient outcomes: the evolution of a quality improvement curriculum in an internal medicine residency. *Acad Med*. 2014;89(10):1341–7.
7. **Association of Program Directors in Internal Medicine, Fitzgibbons JP, Bordley D, Berkowitz L, Miller BW, Henderson MC.** Redesigning residency education in internal medicine: a position paper from the association of program directors in internal medicine. *Ann Intern Med*. 2006;144:920–6.
8. **Francis MD, Wieland ML, Drake S, et al.** Clinic design and continuity in internal medicine resident clinics: Findings of the Educational Innovations Project Ambulatory Collaborative. *J Grad Med Educ*. 2015;7(1):36–4.