Practice Management

A Controlled Trial of an Advanced Access Appointment System in a Residency Family Medicine Center

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Background and Objectives: *The implementation of advanced access appointment systems has improved continuity of care, patient and physician satisfaction, physician productivity, and average physician panel size in private practice and group-model HMO settings. This study's purpose was to document the patient care benefits, practice management benefits, and educational outcomes from the controlled implementation of an advanced access appointment system in a residency family medicine center.* Methods: *Two faculty-resident teams were created. One team adopted the advanced access system while the other team continued using a traditional access system. Outcome measures included length of time needed to obtain an appointment (days to third available appointment), continuity (percentage of visits with the patient's designated provider), no-show rates, productivity, visits lost to outside providers, panel sizes, and patient satisfaction. Outcomes were measured at baseline and quarterly for 1 year after initial implementation.* Results: *After implementation, the "days to third available appointment" for the advanced access group was 5 days, compared to 21 days for the traditional access group. A significant improvement in continuity (ie, a match between the primary care physician and patient) for the advanced access team was found. Comparison of no-show rates between the advanced access and traditional access teams revealed significant between-subjects effect, but controlling for within-subject variation using repeated measures ANOVA eliminated this effect. Advanced access residents increased their continuity above 50% while increasing provider satisfaction with office practice and scope of practice.* Conclusions: *Faculty and residents can successfully use advanced access. Advanced access can enhance residency education by reducing appointment delays and significantly increasing the patient-primary care physician match.*

The success of family medicine residency programs is highly dependent on the growth and maintenance of a diverse patient population in the family medicine center. Adequate patient volumes are achieved and maintained by providing excellent service, as measured by patient satisfaction.[1-4] Continuity of care between physicians and their patients is an important factor in patient satisfaction and health outcomes.[3] Unfortunately, the part-time status of residents and faculty as physicians in the family medicine center is a threat to continuity of care. Same-day appointments are difficult to achieve for academic as well as nonacademic practices and a significant cause of stress for physicians and their patients.[5]

Traditional appointment systems in the private practice sector have been shown to be deficient in matching supply and demand for urgent or same-day appointments. Traditional appointment systems have also been shown to contribute to no-show rates for appointments scheduled into the future as well as decreasing patient satisfaction. Therefore, traditional appointment scheduling systems lead to similar problems in residency training settings.

Advanced access appointment systems match day-to-day demand for appointments with the supply of appointments. Murray and Tantau developed this method over the last few years, and others have shown the method to be a particularly valuable appointment management system both in the group model health maintenance organization and private practice settings.[6-12] Advanced access has improved appointment availability, continuity of care, and both patient and provider satisfaction in these settings.[9] Murray and Tantau have also suggested that advanced access appointing is difficult to implement with providers who work less than 60% of a 5-day workweek (ie, less than 6 out of 10 half days), which is the situation in most family medicine residency programs.

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In a recent article, Murray et al noted that advanced access was only able to be successfully implemented in one of eight academic, non-family medicine primary care programs.[13] To our knowledge, the benefits of advanced access have never been studied in a family medicine residency family medicine center.

This study's purpose, therefore, was to analyze the potential patient benefit and practice management and educational outcomes of a controlled implementation of advanced access appointing in a family medicine residency family medicine center. Our hypothesis was that advanced access appointing would improve continuity of care, patient satisfaction scores, no-show rates, and the primary care physician-patient match percentage in the model family medicine center for both faculty and residents. Based on others' experience with advanced access in other settings, we also hypothesized that advanced access appointing would improve physician productivity. Further, we anticipated that advanced access appointing would increase continuity of care for residents to the level of the Residency Assistance Program (RAP) recommendation that a majority (>50%) of a residents' visits be with their own panel of patients.

Methods

Prior to the beginning of data collection, the study protocol was reviewed and was approved by the Institutional Review Board of the Guthrie Clinic/Robert Packer Hospital in Sayre, Pa.

Implementing Advanced Access

Family medicine center faculty physicians were divided into two teams. One team (the experimental group) implemented advanced access appointing, in which only 25% of the daily schedule was prebooked with scheduled appointments, while 75% of slots were left open for same-day access. The other team (control group) participated in a traditional appointing system in which only 40%–50% of the daily schedule was held open for same-day or urgent visits. Implementation of advanced access occurred after reduction of the backlog for future appointments had been accomplished. The backlog was reduced before the advanced access implementation date by adding clinic sessions, as well as adding additional appointment capacity to existing clinic sessions.

Three part-time faculty members with a total of 1.3 full-time equivalents of family medicine clinic time were on each team. Appointment schedules on the advanced access team were divided into 15-minute slots, and individual providers determined the visit length required for various clinical issues (eg, a routine follow-up hypertensive or diabetic visit was scheduled as a 15-minute slot, while a geriatric physical examination used two 15-minute slots). Procedures or other complicated office visits used three or four 15-minute slots, depending on complexity. Appointment demand was found to be the highest on Monday and Tuesday, and available appointment hours were increased accordingly at these times. Any patient of an advanced access provider requesting a same-day appointment was offered a same-day appointment with his/her personal physician or with an advanced access team member if the personal physician was not available. The faculty implementation date occurred in April.

After advanced access had been successfully implemented with family medicine center faculty, two residents were added to each team (one second-year resident and one third-year resident). First-year residents were excluded from this trial because their very limited appointment capacity and small continuity practices limit their availability until the PGY-2 and PGY-3 years. Resident implementation occurred in August.

Data Collection

Advanced access and traditional access teams were monitored for 15 months, during which time data were collected. Data were grouped into five 3-month quarters. Implementation of the advanced access team changes took place after the first 3 months. One quarter of pre-implementation ("baseline") data was collected, followed by four quarters of post-implementation data. Variables collected were (1) patient no-show rates as a percentage of total visits, (2) primary care physician-patient match percentage (the percentage of patient visits in which patients were evaluated by physicians who the patients identified as the patients' primary care physician), (3) patient waiting times to obtain 15- and 30-minute appointments measured in days (time to third available appointment), (4) visits lost to urgent care, (5) the average number of patients seen per session, and (6) physician panel size. A variable describing relative value units (RVUs) was also collected, but data for this variable were not available for the last quarter of post-implementation data.

The data were analyzed using repeated-measures ANOVA, with each quarter serving as a within-subject time variable. The contrast analyses produced by SPSS® in its RM-ANOVA package were used to assess time points that were both different from pre-implementation levels and time points that differed from each other during the post-implementation time period. Repeated measures ANOVAs procedures are particularly useful for time-based data since they eliminate the variance contributed by preexisting baseline differences between subjects.

Data was collected on patient satisfaction (satisfaction with "waiting times," "overall appointment experience," "would recommend physician in future"). These variables were measured prior to implementation and every 6 months thereafter using the standard patient satisfaction survey of the Medical Group

Management Association. Paired *t* tests and independent *t* tests were used to assess change over time and differences between advanced access and traditional access teams for the satisfaction variables.

All data except for patient satisfaction scores were obtained from the computer database of the family medicine center using the IDX system and then formatted in a project database using the SPSS statistical software program (Version 10.0). Differences were considered statistically significant if *P*<.05.

Results

Waiting Time

Significant reductions over time were noted in the advanced access team for the availability of both 15-minute and 30-minute appointments (both *P*<.001). For each of the four quarters following advanced access implementation, significant reductions in waiting times were seen when compared to pre-implementation levels (all less than *P*<.01). Waiting times decreased from the pre-implementation level of approximately 21 days to between 4 and 7 days, depending on the quarter observed. Significant changes in waiting times were not found in the traditional access team (Figure 1).

Primary Care Physician-Patient Match

A significant improvement in primary care physician-patient match percentage for the advanced access team was also found (*P*<.015). Specific assessment of contrasts revealed that a significant change occurred

between the second and third quarter of implementation (*P*<.03, one tailed). Primary care physician-patient match percentage continued to increase for the advanced access team in subsequent quarters, with each quarter showing over 90% primary care physician match but did not show further significant change. Advanced access residents' primary care physician-patient match percentage increased threefold from baseline measurement. No statistically significant changes were seen on the traditional access team (Figure 2).
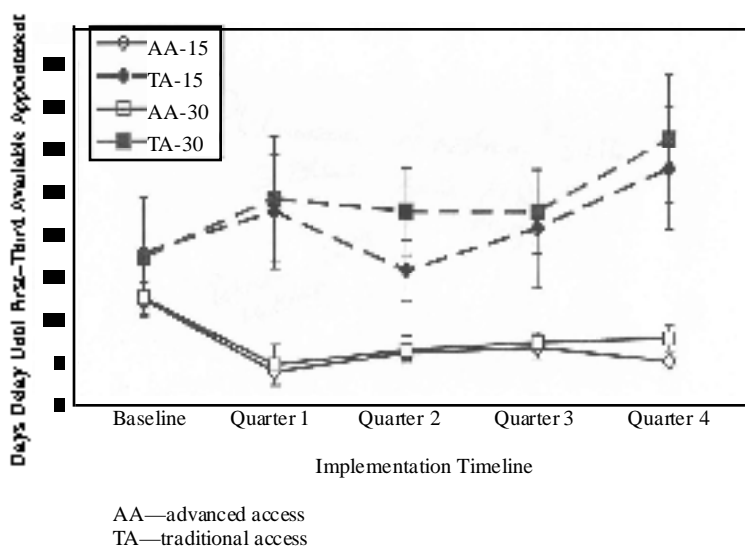
Numbers of Visits and Patients

All physicians showed an increased number of visits lost to urgent care practice, and no significant between-team differences were noted. While a general trend toward a greater number of lost patient visits to urgent care existed across the study time period, there was no evidence that this change was more marked in the advanced access or traditional access team. There were also no significant within- or between-subject differences for the advanced access or traditional access teams in number of patients seen per session over the course of the study.

Repeated measures analyses, however, showed a significant change in RVUs/patient/session produced for the advanced access team (*P*<.05) but not the traditional access team. Closer inspection of quarterly data revealed that a significant increase in RVUs/patient/session occurred for the advanced access team in the first quarter when compared to baseline data (1.32 to 1.51) but not for the second (1.21) or third quarters (1.31).

No-show Rates

No-show rates for the advanced access team showed a steady decline from 9.23% (standard error [SE]=1.87) at baseline to 6.67% (SE=1.28) at the end of the third quarter of post-implementation (data for the fourth quarter were incomplete). However, after adjusting for within-subject variation using a repeated measures ANOVA, this effect was no longer significant (*P*<.25). Analyses revealed a similar pattern for the traditional access team. A between-subjects analyses showed an apparent significant reduction in no-show rates between baseline and the third quarter (8.60% to 7.80%, *P*<.01), but after controlling for individual variations, this effect also was no longer significant (*P*<.59). Therefore, while there was some evidence to suggest a reduced no-show rate for each group, more powerful analyses suggest that significant changes in no shows did not occur for

Figure 1

Time to Third Available Appointment Delay Differences in Advanced Access and Traditional Access Teams for 15-minute and 30-minute Appointments
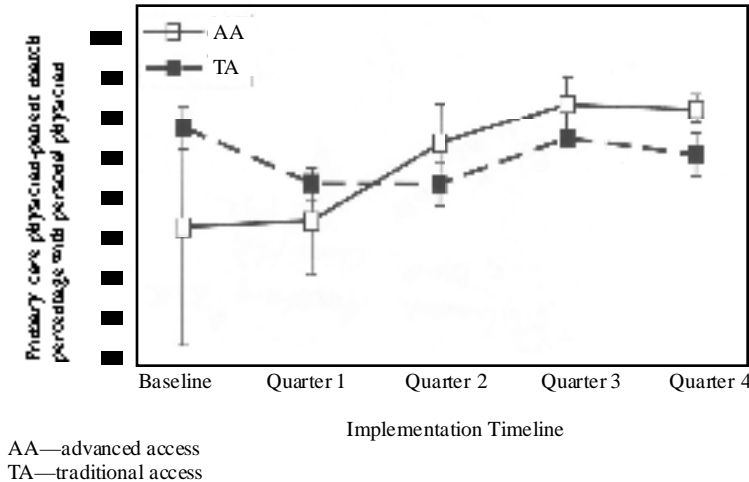

AA—advanced access
TA—traditional access

Figure 2

Primary Care Physician-Patient Match Percentage With Personal Physician for Advanced Access and Traditional Access Teams

AA—advanced access
TA—traditional access

either team over the course of the study. Residents on both teams reduced their no-show rates considerably, but there were no statistically significant differences between the advanced access and traditional access teams (Figure 3).

Panel Size

No significant changes in panel size were seen for the advanced access team over the course of the study (685.25 at baseline was high value to low value of 682.40 in the fourth quarter). Repeated measures analysis of within-subjects contrasts revealed that panel sizes for the traditional access team significantly increased ($P<.05$) from 529.33 to 562.67 (baseline to the fourth quarter of post-implementation sizes). The advanced access team panel sizes were high at the onset of the study and remained unchanged throughout the study period.

Patient Satisfaction

Data revealed no differences in patient satisfaction after advanced access implementation for overall appointment experience, satisfaction with appoint-ment waiting time, or likelihood to recommend their primary care physician in the future. Further, there were no differences between the advanced access and traditional access teams on any of these variables over the course of this study. Residents in the advanced access group also voiced higher levels of satisfaction with office practice as a result of increased continuity.

Discussion

This study describes the controlled implementation of advanced access appointing in a family medicine residency setting. Our results are similar to those seen in the private practice setting, with improvements in access to appointments and continuity of care. The advanced access team achieved a 90% continuity rate after implementation, even though faculty and residents worked part-time in the family medicine center. Resident continuity rates exceeded the >50% RAP benchmark as a result of advanced access, and residents were more satisfied with their office practice after experiencing the advanced access system.

No-show rates for faculty in both the advanced access and traditional access groups remained low and essentially unchanged throughout the study. Resident

Figure 3

No-show Rates for Residents
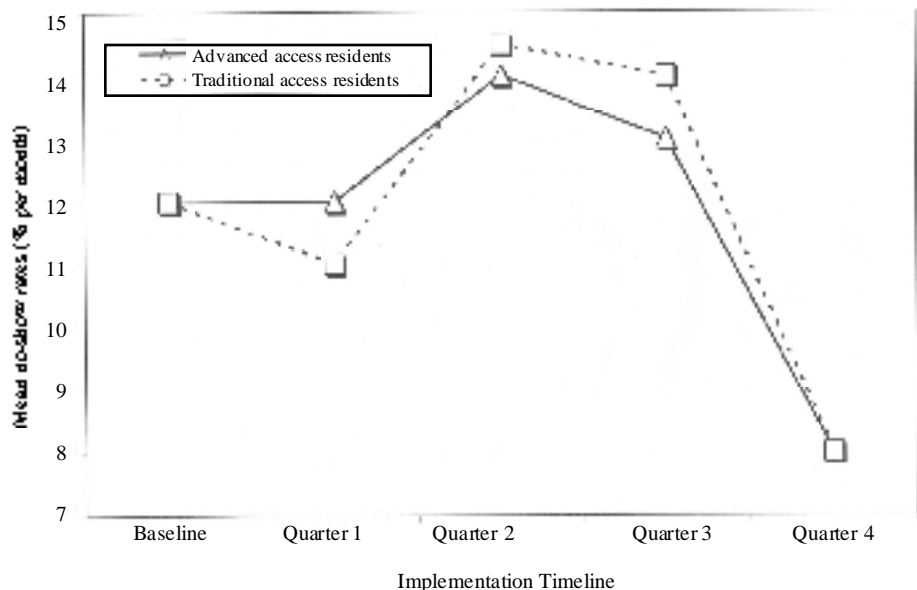
no-show rates, however, for both the advanced and traditional access residents, dropped from a peak of 14% before the intervention to a low of 8% after the intervention, suggesting a "halo effect." It was anticipated that the advanced access residents would have experienced a greater decline in no-show rates compared with the traditional access residents due to the higher primary care physician match for the advanced access residents.

RVUs were noted to be increased in the first quarter of the study, but this effect was not sustainable throughout the subsequent quarters. Our expectation that RVUs would increase as a result of providing more comprehensive services on each visit was not supported.

Patient satisfaction scores did not change appreciably for either team during the study. This outcome was unexpected, and possible explanations for this were that patient satisfaction scores were already high before the institution of advanced access or that advanced access had no significant influence on patient satisfaction during the study period.

Limitations

There are several issues that could have affected the validity or generalizability of our study results. First, the small number of faculty and residents on the experimental and control teams reduced the power of the study to detect modest changes in variables such as patient satisfaction. Second, real-world events may have affected the results. For example, one faculty member on the traditional access team was on maternity leave for part of the study, which probably affects primary care physician-patient match data for the traditional access group. Similarly, residents on both teams had off-site electives that took them away from the family medicine center for a month at a time, affecting continuity in both groups. Finally, one advanced access faculty member was relatively new to the practice and still building his practice during the first two quarters of this study, no doubt affecting this physician's continuity, number of patients seen, and RVUs.

Conclusions

Even with these limitations, we conclude that implementation of advanced access was successful in our residency practice. An advanced access system could solve the problems of access and continuity experienced by most family medicine residency education programs. Improving the residents' primary care physician-patient match correlated with improvement in the resident's scope of diagnoses, which enhances the educational experience. A high primary care physician-patient match also improved our residents' satisfaction with office practice.

In the ideal advanced access appointment system, the goal is to achieve a 1-day delay to the third available appointment. In our study, we achieved a 4- to 5-day delay to the third appointment. This may still be seen as success in a residency setting in which the average faculty and resident provider is in the office on a part-time basis. Overall, advanced access may be a way to provide a better model family medicine training environment for future family physicians.

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